NRA U.S. CODE GRAPHIC ARTS INDUSTRY 1934

Pit and Quarry

With which is consolidated

CEMENT-MILL & QUARRY

August, 1934

DCT 25 1934

ROBINS SCREENS ARE INTERNATIONAL

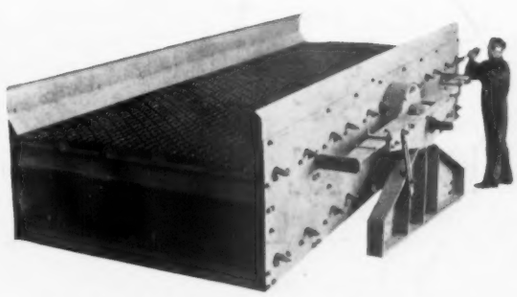
RECENT ORDERS HAVE INCLUDED—

Six GYREX SCREENS for sizing Gold Ore in South Africa,

Eleven GYREX SCREENS for sizing Coal in South Africa,

Four GYREX SCREENS for scalping Iron Ore in Morocco,

Two VIBREX SCREENS for separating Bagasse in Hawaii.



A Double Deck ROBINS GYREX SCREEN six feet wide by sixteen feet long to handle 250 tons per hour of Iron Ore.

These foreign purchases are in addition to scores of orders from all parts of the United States for screens to handle Stone, Sand and Gravel, Slag, Ore, Coke, Coal, etc., etc.

***The Reason Is Simple*—ROBINS SCREENS ARE DEPENDABLE**

They do the work they are built to do—smoothly, quietly, continuously. The GYREX SCREEN is described in a new bulletin—Ask for your copy.

ROBINS also builds dependable Belt Conveyors and a host of other material-handling units, as well as Complete Plants.

Forty years' engineering experience at your service

ROBINS CONVEYING BELT COMPANY

15 Park Row, New York — **Old Colony Bldg., Chicago**

Boston
Charleston, W. Va.
Cleveland
Detroit

MATERIAL HANDLING ROBINS EQUIPMENT

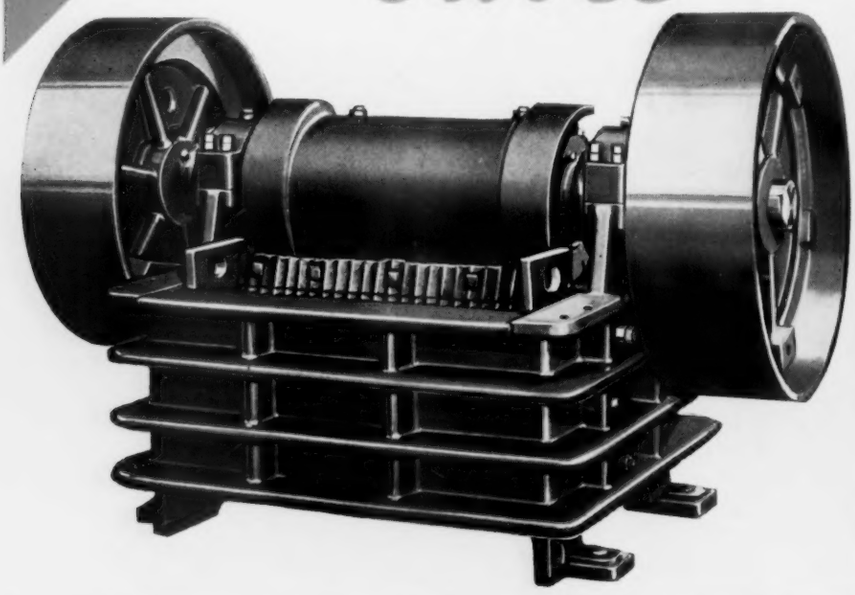
Philadelphia
Pittsburgh
London
Johannesburg

Representatives in other principal cities

★ Pages 17-25

A DIAMOND *Roller Bearing* CRUSHER

Saves —



HORSEPOWER:

Power tests with electrical measuring instruments prove Diamond Crushers, under identical conditions, operate with 30% less power than the ordinary plain bearing type requires.

OIL:

The roller bearings are sealed in grease before leaving the factory and require about two pounds of grease a week. This represents a considerable saving over the large amount of oil used every day by plain bearings.

MAINTAINANCE:

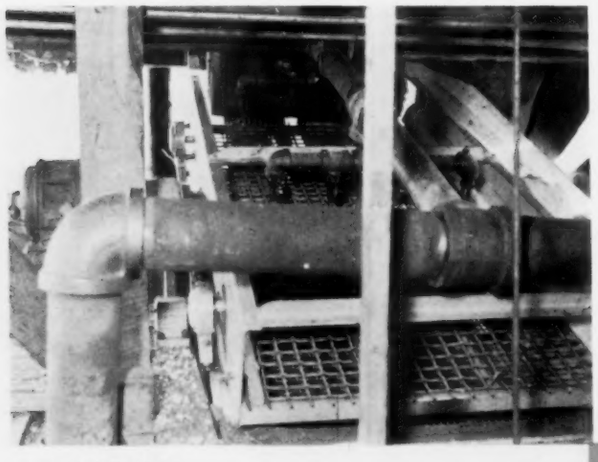
The manufacturer of the bearings used in the Diamond Crusher guarantees the bearings for a minimum number of working hours which averages about two years. This guarantee is based on 25% of expected life.

ESTABLISHED 1882

DIAMOND IRON WORKS INC.

MINNEAPOLIS, MINNESOTA

another



SUCCESSFUL JIGGER Installation

The Neal Gravel Co. wanted to replace two rotary screens with an efficient vibrating screen.

After an exhaustive survey they chose JIGGERS. This is but one of many such cases—giving the JIGGER a sensational sales record for 1934.

FEATURES

- Throw adjusted to suit material.
- Easily tilted angle—readily changed.
- Self centering stabilizers.
- Self aligning housings.
- Oil Lubrication.
- Soft shoe mountings.
- Circle Throw movement.

Remember

only a JIGGER can give classification the way it should be done today—accurately and at the lowest costs. Write for complete information without obligation.

PRODUCTIVE EQUIPMENT CORPORATION

210 East Ohio Street — Chicago, Ill.

Latest GMC VALUE

A NEW 5-TON TRUCK

FEATURES

GMC valve-in-head engine—94 h.p.—230 ft. lbs. torque—stellite exhaust valve seats—downdraft carburetor—oil reservoir air cleaner—roller bearing fan with dual "V" belt drive—9" frame—booster brakes—448.7 sq. in. braking area—cast nickel iron brake drums—radius rod drive—standard S. A. E. loading space—full floating spiral bevel rear axle—needle bearing universal joints—spoksteel wheels.

■ It's here! A brand new General Motors Truck. A big, husky 5-ton truck—priced at the lowest figure ever quoted on a GMC of this capacity. *In fact, priced $1,000 under the average price of all other leading 5-ton trucks!*

Not only in price, but in design, construction and performance, this new GMC worker is just what thousands of owners will find exactly fitted for the job of hauling 5-ton loads more profitably.

Any GMC dealer will gladly tell you more about this latest addition to the modern, complete line of GMC quality trucks. Or an interesting descriptive booklet will be mailed upon request.

GENERAL MOTORS TRUCKS AND TRAILERS

GENERAL MOTORS TRUCK COMPANY — Time Payments Available Through Our Own Y. M. A. C. — PONTIAC, MICHIGAN

OCT 19 1934 ©CIB 240356

Pit and Quarry

With which is consolidated CEMENT-MILL & QUARRY

Volume 27 August, 1934 Number 2

MEMBER AUDIT BUREAU OF CIRCULATIONS

Published on the first of each month for producers and manufacturers of Cement, Crushed Stone, Gypsum, Lime, Sand, Gravel and other non-metallic minerals. Entered as second-class matter November 28, 1932, at the Postoffice at Chicago, Ill., under the Act of March 3, 1897.

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NRA U.S. CODE GRAPHIC ARTS INDUSTRY 1934

No wonder they prefer Goodyear Truck Tires for HEAVY HAULING

They perform better. They wear longer. They give better service in pit and quarry. They have extra strength—extra traction—extreme durability. . . . These are the qualities you have to have to haul cement, crushed stone, sand and gravel. These are the qualities Goodyear has —PLUS.

ONLY GOODYEAR gives you *that world-famous, exclusive All-Weather tread*—providing far greater traction and safety.

ONLY GOODYEAR gives you *patented pre-shrunk Supertwist cord construction*—assuring durability and protection against blow-outs.

ONLY GOODYEAR gives you *the new, improved Goodyear bead construction*—preventing breaks from swaying loads.

ONLY GOODYEAR gives you *the new flat, high-shoulder tread shape*—for long, smooth wear and to distribute the load over a wide area.

ONLY GOODYEAR gives you *special chemically-toughened body rubber*—to resist the destructive effect of heat.

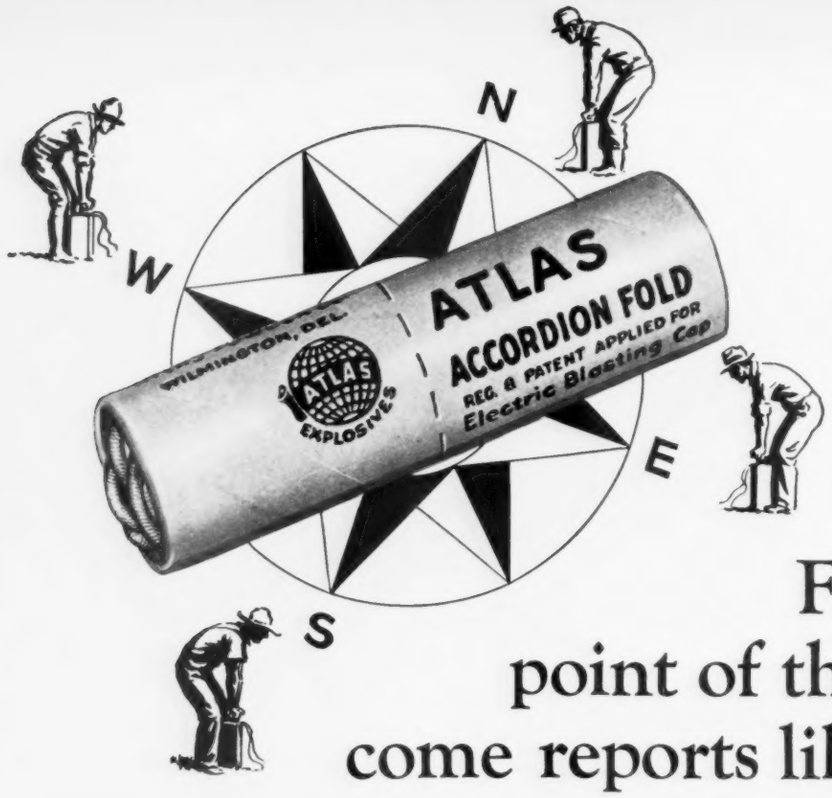
ONLY GOODYEAR gives you *Pima cotton*—the longest fibre grown—insuring long, trouble-free mileage—blow-out protection in EVERY ply.

All exclusive advantages. All basic Goodyear superiorities. They all add up to MONEY SAVERS. That's why more tons are hauled on Goodyear Truck Tires than on any other kind.

NRA

GOODYEAR

TRUCK TIRES — *Money savers*



From every point of the compass come reports like this . . .

"The Atlas Accordion Fold represents the greatest convenience and safety ever developed in electric blasting practice."

BLASTERS the country over are enthusiastic about the handy Accordion Fold Packaging of Atlas Electric Blasting Caps.

Never before had such a combination of safety and convenience been offered to users of electric firing. Never has a new blasting development received more immediate or more widespread recognition.

Wherever electric blasting is done, the use of Atlas Electric Blasting Caps in the Accordion Fold Handy Package is rapidly becoming standard practice.

The package itself commands attention. The use of the Accordion Fold carries conclusive conviction of its advantages in increasing the safety and convenience of all electric blasting operations. If you have not seen the Accordion Fold, ask the Atlas representative to show it.

ATLAS POWDER COMPANY, WILMINGTON, DEL.

Cable Address—Atpowco

Everything for Blasting

OFFICES

Allentown, Pa.	Houghton, Mich.	Memphis, Tenn.	Pittsburgh, Pa.	Spokane, Wash.
Boston, Mass.	Joplin, Mo.	New Orleans, La.	Portland, Oregon	St. Louis, Mo.
Butte, Mont.	Kansas City, Mo.	New York, N. Y.	Salt Lake City, Utah	Tamaqua, Pa.
Denver, Colo.	Knoxville, Tenn.	Philadelphia, Pa.	San Francisco, Calif.	Wilkes-Barre, Pa.
	Los Angeles, Calif.	Pittsburg, Kansas	Seattle, Wash.	

ATLAS
EXPLOSIVES

ANNOUNCEMENT

The W. S. Tyler Company is pleased to announce that it has acquired all the United States patents and pending patent applications under which a complete line of vibrating screens, washing and scrubbing apparatus has heretofore been manufactured by the Niagara Concrete Mixer Company, Buffalo, New York.

Effective immediately, all orders for screens, scrubbers and screen replacements, heretofore manufactured by the Niagara Company, may be sent direct to The W. S. Tyler Company at Cleveland, Ohio.

For the protection of present users of Niagara Screens and Scrubbers, it is planned to carry at Cleveland an ample stock of repair and replacement parts and to render a prompt and efficient service in this respect.

THE W. S. TYLER COMPANY,

PRESIDENT.

Cleveland, Ohio
July 11th, 1934

FURTHER EVIDENCE

(*Exact reproduction of an actual photograph*)

THAT

WAR *doesn't pay!*

Ordinary (*non*-preformed) wire rope is metallurgical proof that war doesn't pay.

In *non*-preformed wire rope there is constant, unceasing warfare between wires and strands. Unseen—but none the less there—locked in by twisted force. Indeed, so heavy and severe are the internal stresses and strains literally 30% of each wire's vital strength, energy and durability is wasted in a futile effort to untwist. . . . Yank the seizing from the end of an ordinary wire rope and you'll find this to be true, because once an end is free, the strands and wires explode like released clock-springs.

Thus eternal warfare between the wires and strands of *non*-preformed wire rope results in at least a 30% loss in wire rope service.

● In LAY-SET Preformed Wire Rope there is no internal warfare. . . . Because each wire and strand in LAY-SET is pre-formed, in manufacture, to the exact shape of the rope. LAY-SET is *relaxed* rope; a rope in which there is no twisted resistance—no internal tension, strain, or warfare.

Being preformed—being free from destructive internal stresses—LAY-SET resists kinking, resists twisting in the grooves of sheaves, requires no breaking-in, handles much easier, is easier to install, socket or splice, requires no seizing.

Preforming makes it possible for every single wire to give you its full measure of service. LAY-SET Preformed Wire Rope is busy working for you—not preoccupied with internal warfare. That's why LAY-SET gives so much longer, so much more satisfactory, so much more trouble-free service.

An interesting booklet containing complete information and proof of the superiority of LAY-SET Preformed Wire Rope will be sent on request.

UNRETOUCHED PHOTO OF ORDINARY WIRE ROPE

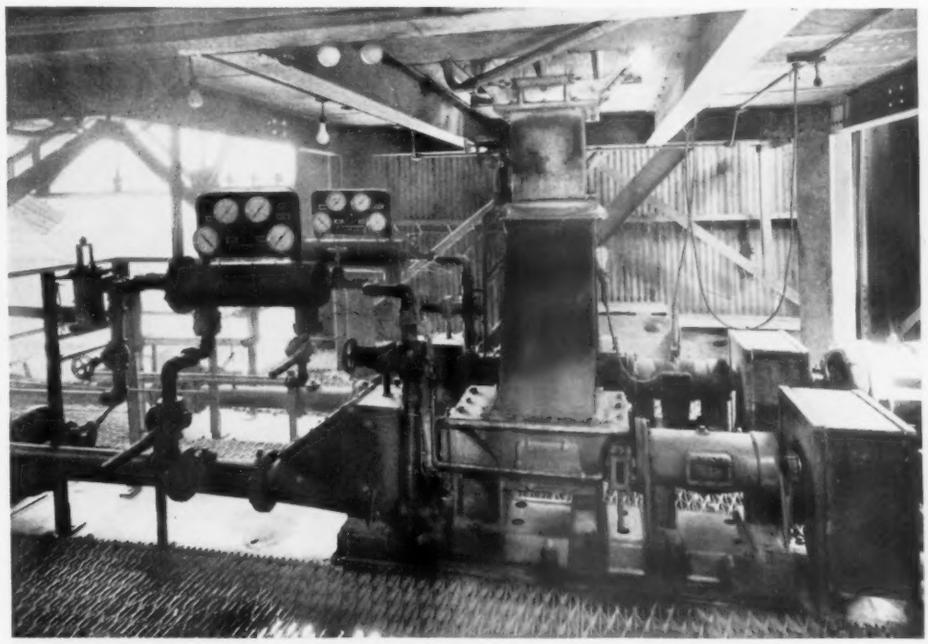
UNRETOUCHED PHOTO OF LAY-SET PREFORMED WIRE ROPE

HAZARD WIRE ROPE COMPANY
Wilkes-Barre, Pennsylvania
New York Chicago Fort Worth San Francisco Philadelphia
Pittsburgh Denver Los Angeles Birmingham Tacoma

LAY·SET *Preformed** Wire Rope

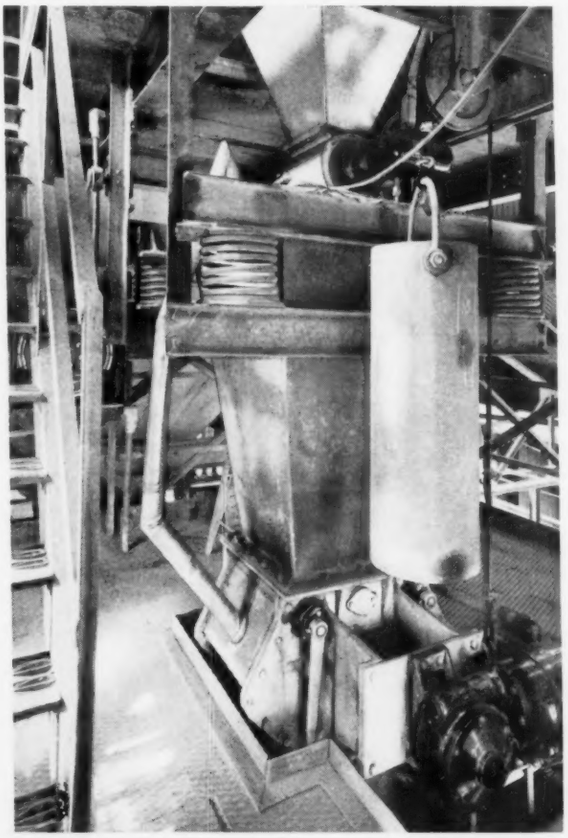
*PREFORMING IS A PATENTED MANUFACTURING PROCESS APPLICABLE TO ANY TYPE, GRADE, CONSTRUCTION AND LAY OF WIRE ROPE—WITH THE RESULT OF GREATLY INCREASING ITS SERVICE

A MORE ECONOMICAL PUMP, AND AN ACCURATE FEEDER



Two Type "H" Fuller-Kinyon Pumps (5") conveying cement raw material through the "Grudex" Preheating Unit, serving No. 2 kiln at the plant of the Coplay Cement Mfg. Company. Each pump conveys through independent pipe coils approximately 1200 feet in length. The feed to these pumps is measured accurately by weight by our new weighing feeder, the discharge feeder of which may be seen above the spout. The weight of the stream is remotely controlled from the burning end of the kiln.

FEEDING BY WEIGHT



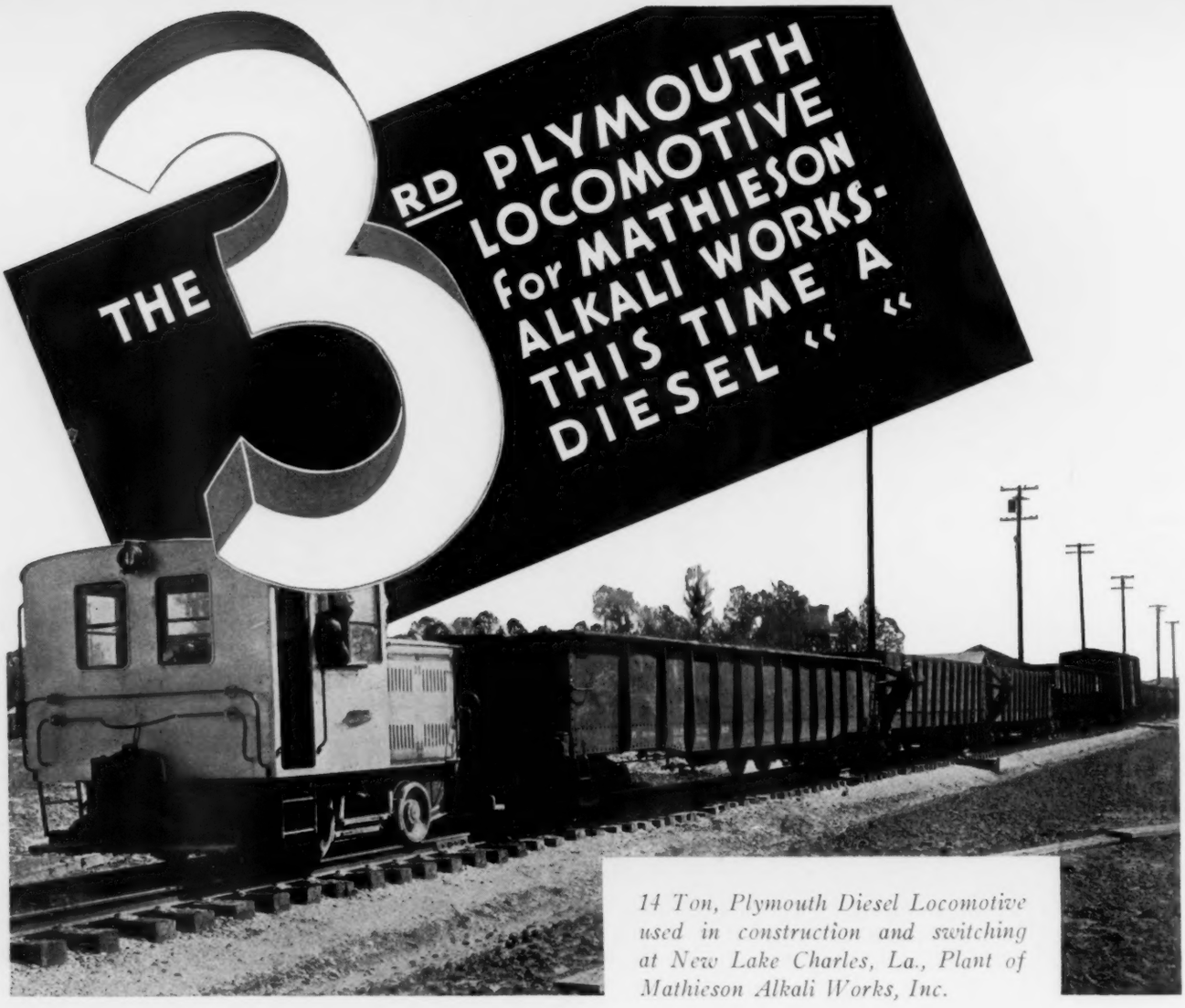
Automatic Weighing Feeder serving the "Grudex" Preheater Unit described above. This new feeder delivers a stream of predetermined weight, automatically compensated for variation in weight per unit of material volume due to any cause. The weight of the stream is increased or decreased by remote control. It will handle substantially all dry pulverized materials.

Low pressure, low velocity pumping offers you substantial savings in both power and maintenance costs. The new Type "H" Pump was specifically designed to operate under stable conditions and with high power economy at variable rates of feed. This well adapts it for installations such as that illustrated, or under other conditions where the system may be operated at less than its full capacity, as when a part of a tube mill installation is idle. Although maintenance costs have always been inconsiderable as compared with other conveyors, low velocities and reduced friction have made a further reduction in wear.

Pulverized materials can be fed accurately by *weight* by the new feeder shown at the left. The feeder does not flood, it adjusts itself automatically to variations in the weight of material, due to aeration or otherwise, and the weight of the stream can be varied through all normal ranges by remote control, without adjusting the scale.

Fuller Company
CATASAUQUA, PENNA. U.S.A.

Chicago: 1118 Marquette Bldg.
Paris: E. Constantin, 105, Rue Lafayette.
Hamburg: Claudius Peters, Walhoff, Glockengiesserwall 2.



14 Ton, Plymouth Diesel Locomotive used in construction and switching at New Lake Charles, La., Plant of Mathieson Alkali Works, Inc.

This latest addition to the world-famous line of Plymouth Locomotives is not only NEW but is THOROUGHLY PROVED on this and other tough assignments in construction or plant switching service.

Note these outstanding Plymouth features:

- Welded slab steel frames . . . unbreakable.
- Semi-Elliptic, cross-equalized, three point spring suspension.
- Timkin tapered roller bearings.
- Rugged six-cylinder Caterpillar Diesel engine.
- Plymouth experience.

Your bulletin is ready covering the size Plymouth Diesel YOU are interested in —4 to 60 ton. Write for it.

PLYMOUTH LOCOMOTIVES

» GASOLINE » » DIESEL »
GAS ELECTRIC DIESEL ELECTRIC

PLYMOUTH LOCOMOTIVE WORKS, PLYMOUTH, OHIO, U. S. A.

ECONOMY

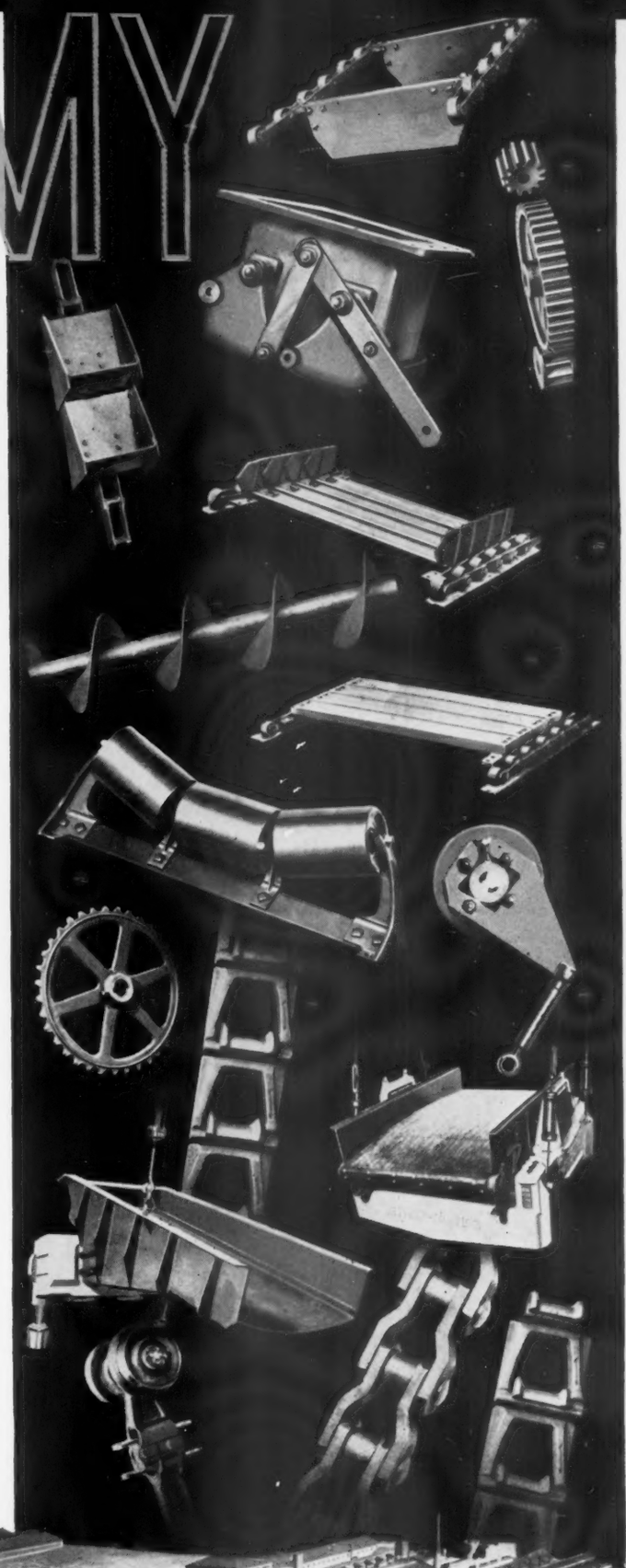
ON ANY JOB DEPENDS ON THESE FACTORS . .

1. Design . . based on years of engineering experience and proved in service.
2. Construction . . the use of only high quality material and craftsmanship.
3. Applicability . . skill in the job of selecting and installing equipment to meet squarely any handling problem you may have.
4. Low Upkeep . . economy of operation and minimum repair cost.

Jeffrey Products . . just a few are illustrated here . . have a reputation for being well-made, for giving long service and for economical operation.

Jeffrey Engineers have had decades of experience in determining the right unit for your need. Let them assist you to economical, satisfactory, low maintenance material handling.

Write for complete information.



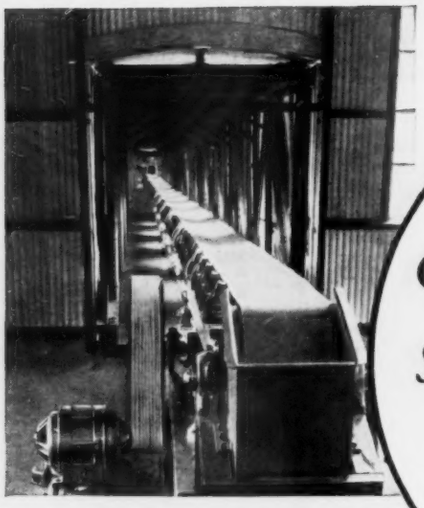
THE JEFFREY MANUFACTURING CO.

917-99 North Fourth St., COLUMBUS, OHIO

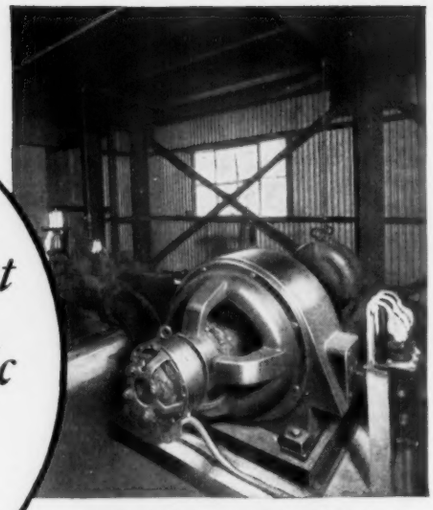
New York	Boston	Chicago	Denver
Buffalo	Scranton, Penn.	Huntington, W. Va.	Salt Lake City
Rochester, N. Y.	Cincinnati	Milwaukee	Birmingham
Philadelphia	Cleveland	St. Louis	Dallas
Pittsburgh	Detroit		

Jeffrey Manufacturing Company, Ltd., of Canada
Head Office and Works, Montreal—Branch Offices, Toronto, Calgary, Vancouver

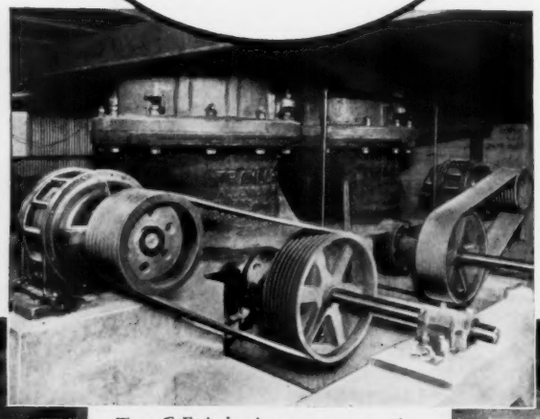
For Your Crushed-stone Plant . . . See General Electric for Everything Electrical



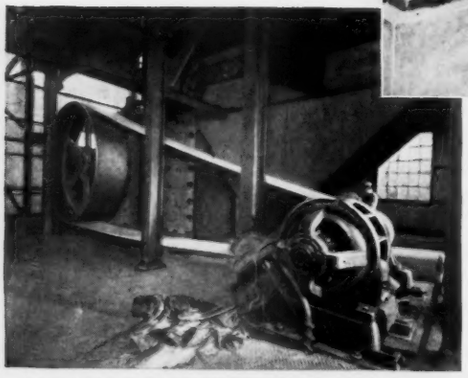
This G-E motorized conveyor handles over-size rock from the vibrating screens. For greater economy of operation, be sure to use General Electric for the RIGHT MOTOR and the RIGHT CONTROL for every type and size of conveyor.



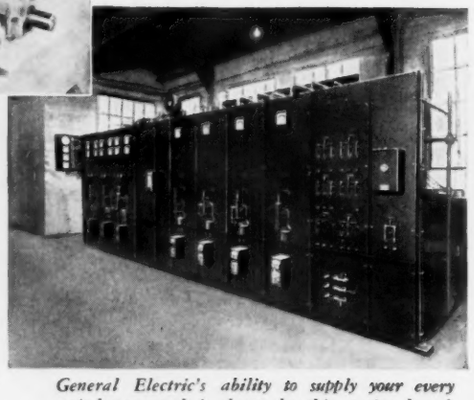
G-E synchronous motors, with their inherent high efficiency and their ability to improve power-factor, dependably and economically drive these centrifugal pumps, which supply water for the stone-washing operations.



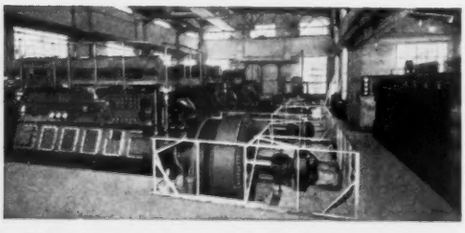
Two G-E induction motors operating finishing crushers through Vulco Rope Drives. Here, again, the RIGHT MOTOR provides greater economy.



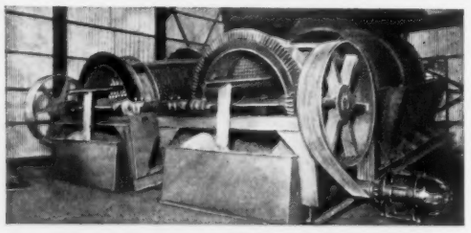
This 250-hp. G-E induction motor drives a 56 by 72-in. primary-jaw crusher. The photograph was taken during installation.



General Electric's ability to supply your every switchgear need is shown by this station board, located in the Diesel power plant.



The power requirements of the plant are supplied by these three 450-kw. G-E generators direct-connected to McIntosh Seymour Diesel engines.



These G-E motorized scalping screens handle the first washing operation—removal of quarry dirt.

THAT'S exactly what the Hudson River Stone Corporation—in whose plant these pictures were taken—did when it equipped its new $1,500,000 plant at Cold Spring, N. Y. This plant is G-E equipped throughout — motors, control, generators, transformers, switchboards, etc.; equipments that will stay on the job, year after year, with G-E reliability.

You, too, will find it profitable to see General Electric for everything electrical for your plant. Here your every need will be met with dependable equipment, progressive engineering, and prompt, competent service. General Electric, Schenectady, N. Y.

020-30

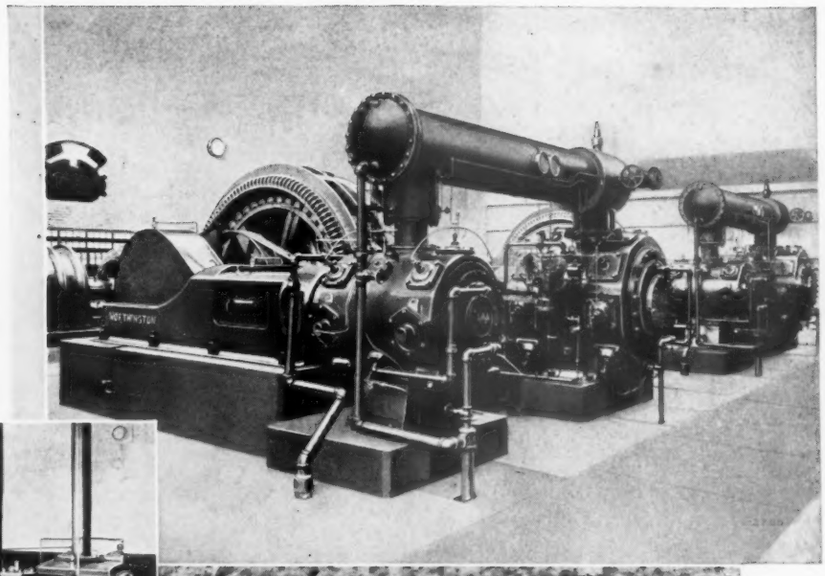
GENERAL ELECTRIC

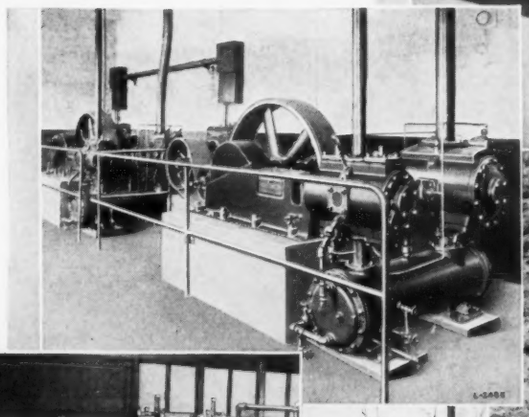
From

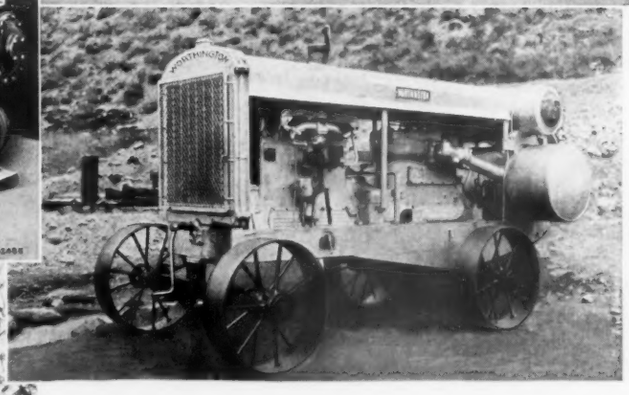
OPENING UP

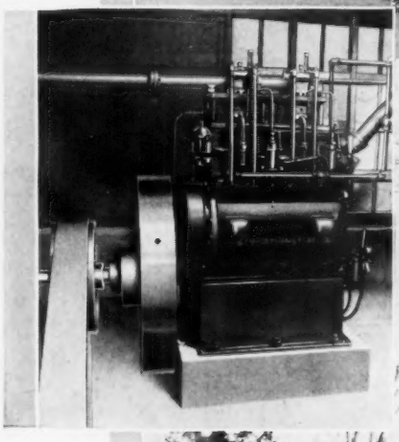
to

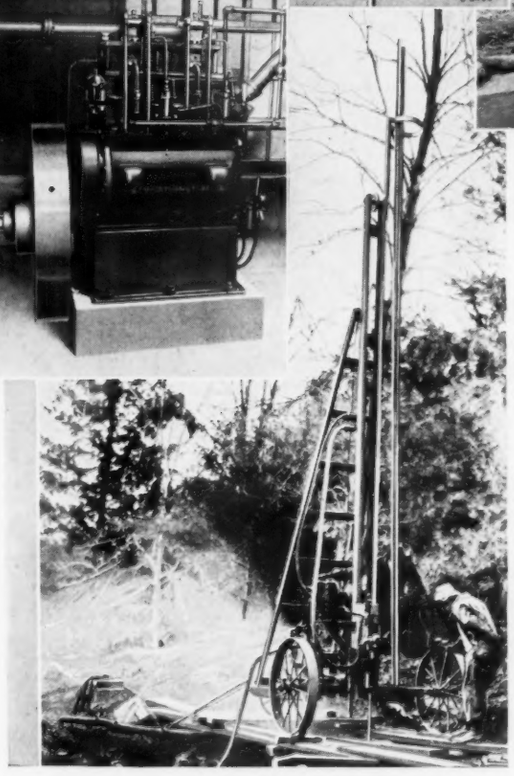
FULL OPERATION











STATIONARY COMPRESSORS
for permanent installation in operation of quarries and mills

PORTABLE COMPRESSORS
for preliminary work in opening up new quarries

DIESEL AND GAS ENGINES
for driving the crushing plant

WAGON DRILLS AND TRIPOD (DRIFTER) DRILLS
for snake holing and deep ledge work

ROCK HAMMERS
for boulder popping and shallow bench work

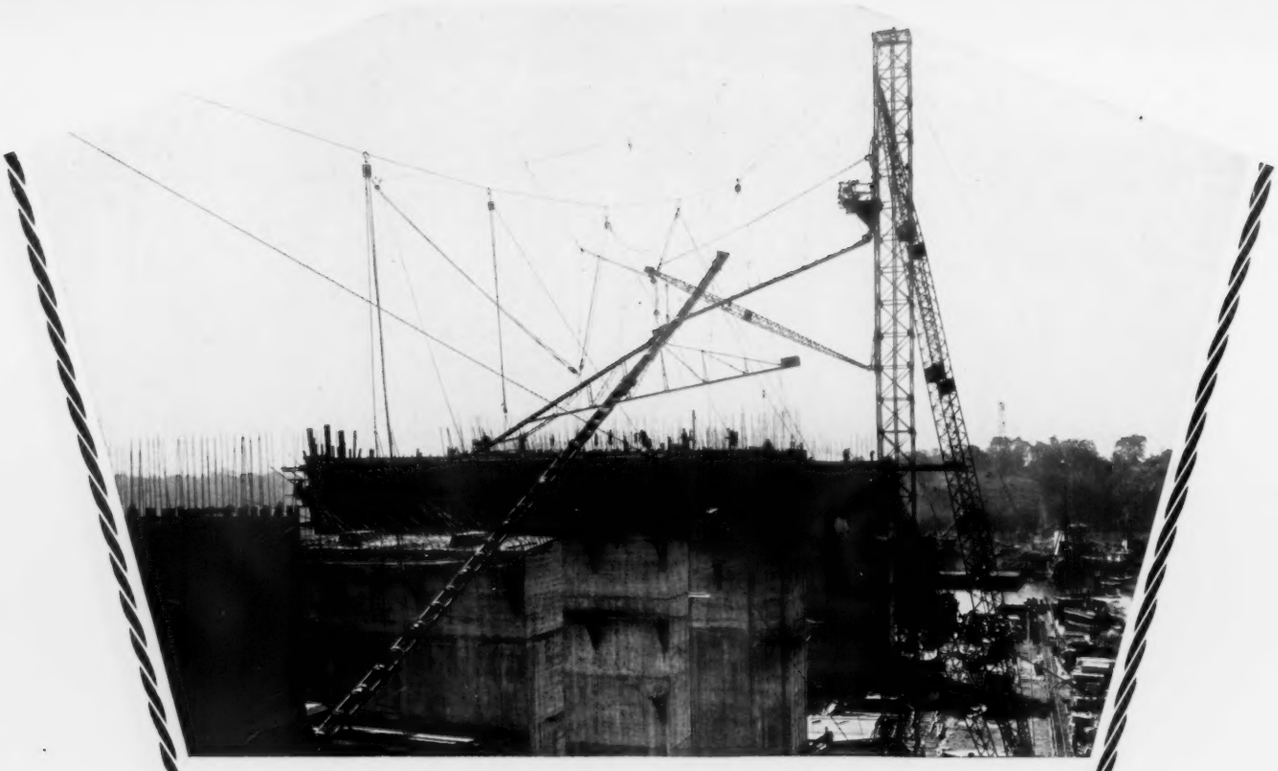
WORTHINGTON PUMP AND MACHINERY CORPORATION

General Offices: **HARRISON, NEW JERSEY** - *Branch Offices or Representatives in Principal Cities throughout the World*

NRA CODE A-34145

WORTHINGTON

ATLANTA BOSTON BUFFALO CHICAGO CINCINNATI CLEVELAND DALLAS DENVER DETROIT EL PASO HOUSTON KANSAS CITY LOS ANGELES NEW ORLEANS NEW YORK PHILADELPHIA PITTSBURGH ST. LOUIS ST. PAUL SAN FRANCISCO SEATTLE TULSA WASHINGTON



Be Safe with WILLIAMSPORT TELFAX *marked rope*

On every construction job, the specter of accident is ever present. Williamsport sensed this many years ago and as a result the Telfax system of tape marking was born. It is today the exclusive safety sentinel of Wire Rope; guarding you against possible substitution of the wrong tensile strength—a most important factor in the use of Wire Rope.

That is not all—Good wire rope of *any* tensile strength and construction must have *uniformity in every wire.* Williamsport method of fabricating and wire drawing insures this.

Let us tell you more about it — write us — permit us to quote you on your very next requirement.

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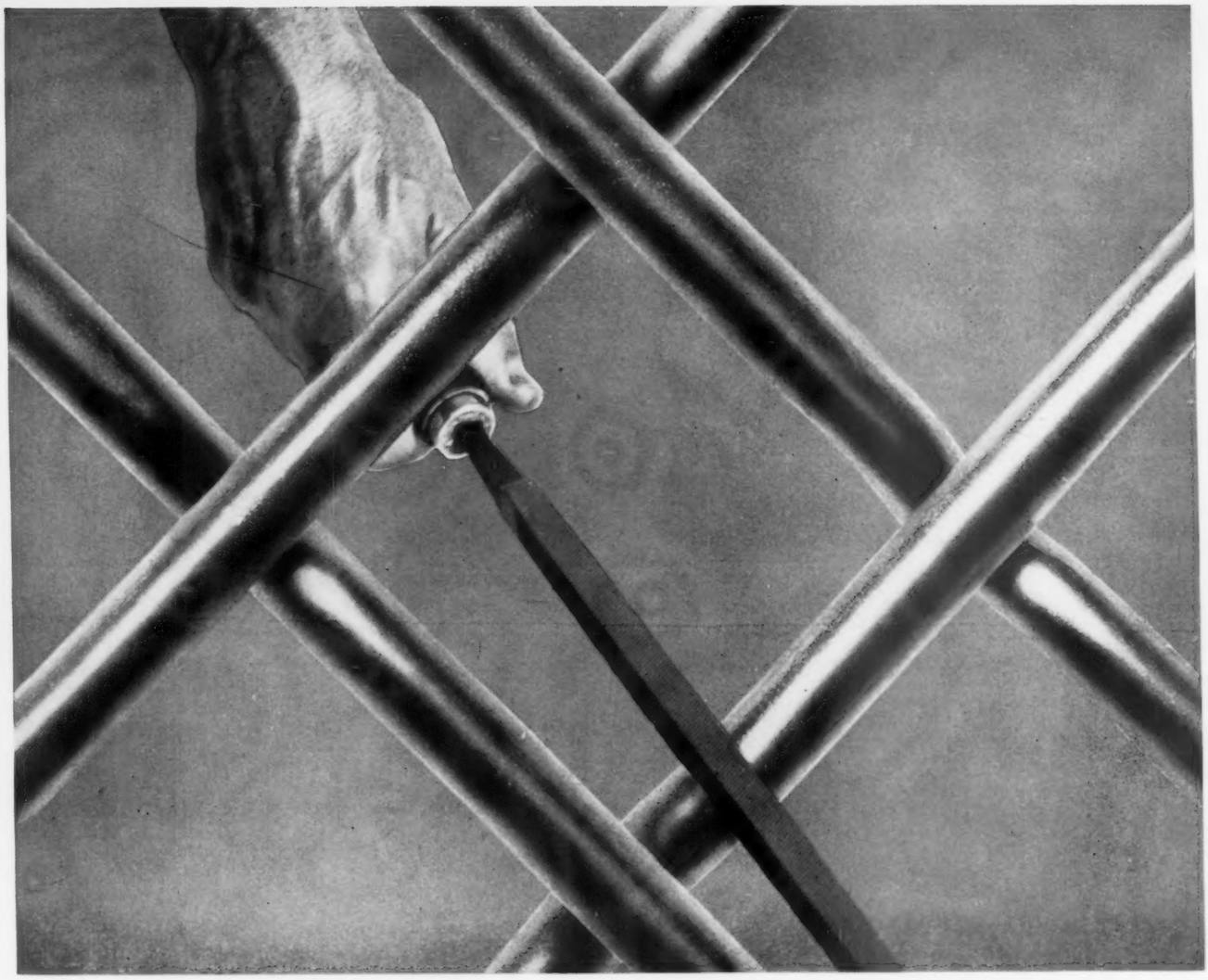


Try to File ROL-MAN!

The Steel that Rises to the Occasion

ROL-MAN

A TRUE MANGANESE STEEL

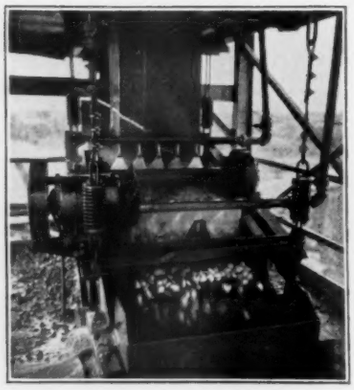
SCREEN CLOTH

– Welding Rods –
Forgings–Plate Products

ROL-MAN cold forges and hardens itself in service, to exactly meet your requirements. It is a *Tough-hard,* processed manganese steel when it leaves our shops, and in screening service, the harder the knocks and abrasion, the harder its surface becomes. As this outside crust slowly wears, the metal beneath increasingly hardens to resist further wear. ROL-MAN is thus never hard enough to be easily broken or soft enough to rapidly wear—This peculiar attribute of ROL-MAN can be proved with a file, for after a few strokes (light or heavy) the steel hardens and the file loses its bite—ROL-MAN Manganese Steel Screen Cloth with Patented *Double Lock Mesh* Weave, which provides a relatively flat free screening surface and prevents distortion of openings, can be applied to every make of vibrator. Put in a ROL-MAN now and measure accurate screening life by months, instead of weeks. Complete information and prices on request.

MANGANESE STEEL FORGE CO.
Richmond St. and Castor Ave. Philadelphia

Complete Washing Equipment *for* Producing Clean Aggregate



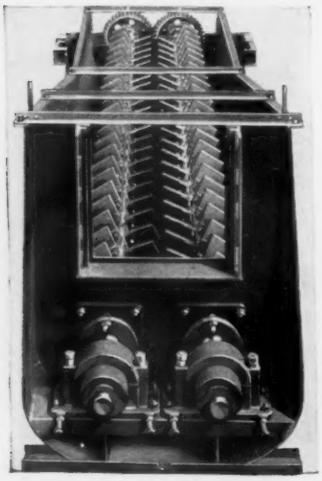
Vibrating Screen with Sprays for Washing.

THE demand for clean washed aggregates is increasing rapidly and concrete specifications are becoming so stringent that this phase of the producing problem has become vitally important.

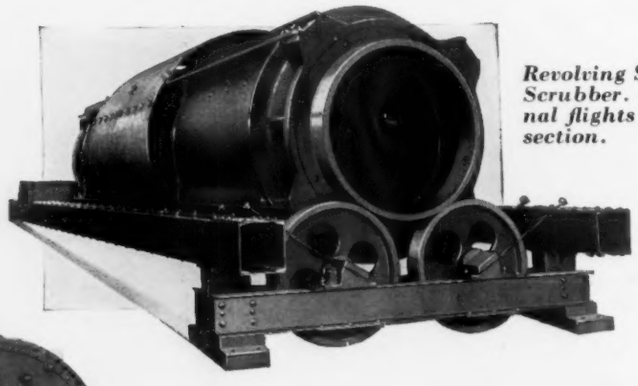
Because some materials are easy to wash whereas others are difficult, depending upon the nature of the deposit, the selection of proper combinations of machinery to meet these varying conditions necessitates a complete line of washing equipment.

Allis-Chalmers has supplied machinery for many washing plants, having a wide range of machinery to meet every condition and engineers with experience in applying this machinery.

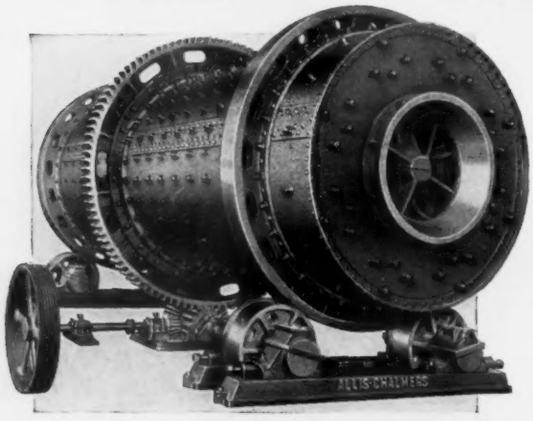
A new booklet has been prepared on this important subject. Write for Bulletin 1471.



Log Washer for Stone or Gravel.

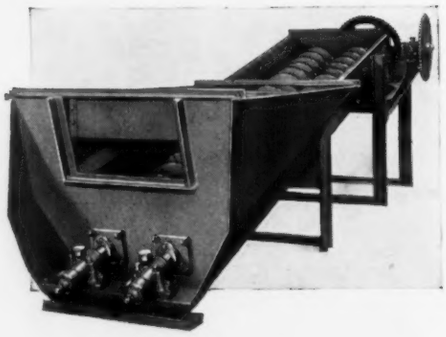


Revolving Screen Type Scrubber. Note internal flights in washing section.



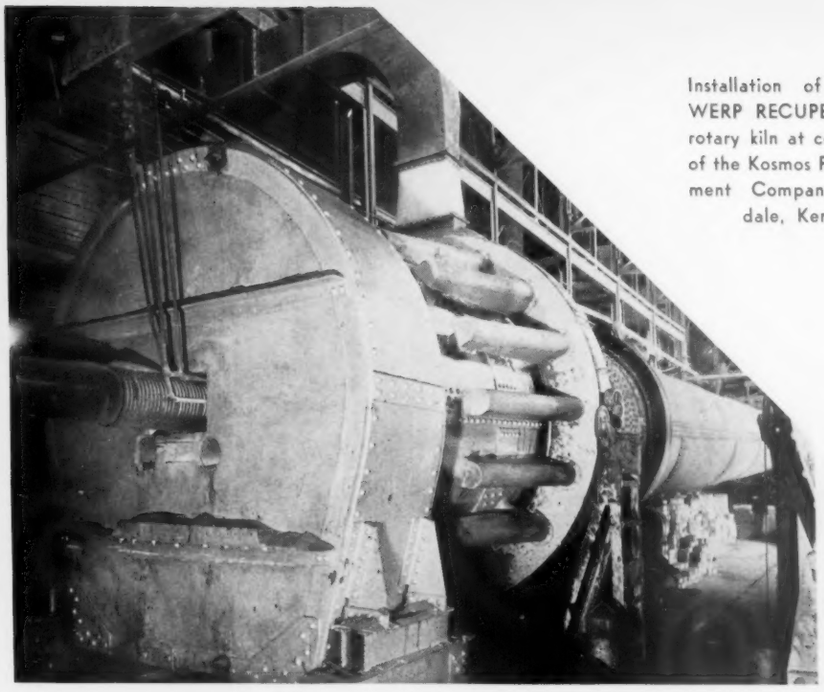
Left - Stone Scrubber.

Right - Double Screw Sand Washer.



ALLIS-CHALMERS

Allis-Chalmers Manufacturing Company, Milwaukee



Installation of VANDERWERP RECUPERATOR on rotary kiln at cement plant of the Kosmos Portland Cement Company, Kosmosdale, Kentucky.

Sensational Savings!

are successfully selling the Vanderwerp Recuperator to the cement industry. The first few installations were put in as a result of performance rather than publicity. It is a tribute to the designing engineers that the Vanderwerp Recuperator has proved itself on every job.

Now we are ready to advertise the facts. From actual operating records, we are able to present figures to show the far-reaching economies that can be obtained by equipping rotary kilns with Vanderwerp Recuperators.

By stopping heat losses in the kiln the Vanderwerp Recuperator shows a fuel saving of 15% to 20%. The clinker discharges at temperatures far below the usual temperature, and the grindability of the clinker is greatly increased by the rapid pressure cooling. The quality of the cement is bettered, as indicated by tests that show increased early-strength.

Producing a higher quality cement at a lower cost is the prime reason for installing a Vanderwerp Recuperator in your plant. Its installation cost is low, as it requires no excavation or foundation work. It is economical to operate and maintain, due to efficient design and sturdy construction in every detail part.

Let us send you full information today on the Vanderwerp Recuperator.

Write for PERFORMANCE RECORDS

VANDERWERP RECUPERATOR

Manufactured by

MANITOWOC ENGINEERING WORKS

MANITOWOC, WISCONSIN

Chicago Office: A. W. Catlin, Special Representative, 131 River St., Michigan Ave. Bridge

A ROUGH PROBLEM SOLVED

CONQUERED 8800 FEET OF MEAN "UP AND DOWN" COUNTRY

THE illustration shows an example of moving material at a very low cost per ton mile by the use of an American Steel & Wire Company designed, manufactured and completely erected Aerial Tramway. This job is moving 100 tons per hour over nearly a mile and three-quarters of bad terrain. Capacity can be increased to 175 tons hourly by just adding rolling stock. The buckets turn a horizontal angle of 29 degrees automatically, as well as being automatically loaded and discharged. Only one operator is required. Whatever and wherever your transportation problem we will be glad to study it with you.

1831 — MORE THAN 100 YEARS OF PROGRESS IN WIRE MAKING — 1934

AMERICAN STEEL & WIRE COMPANY

208 South La Salle Street, Chicago
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SUBSIDIARY OF UNITED STATES STEEL CORPORATION
AND ALL PRINCIPAL CITIES

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VOLUME 27 NUMBER 2

Pit and Quarry

With which is consolidated

CEMENT-MILL & QUARRY

CHICAGO, AUGUST, 1934

Low Wage Scale Denied Hand-Loading Quarries

NRA UPHOLDS CODE MINIMUM

According to an announcement by R. E. Plimpton, assistant deputy administrator of the National Recovery Administration, the request made some time ago by operators of small so-called hand-loading quarries for wage and hour exemptions has been denied. This application, which was reported in the June, 1934, issue of PIT AND QUARRY, p. 37, requested a minimum wage of 25 c. an hour in place of the code requirement of 40 c.

Michigan State Cement Plant to Be Salvaged

The finance committee of the Michigan State Administrative Board has recommended that bids for the cement plant at Chelsea be rejected and that the plant be junked under the direction of the state prison commission. This decision was reached after a bid of $20,000 cash had been received for the clinker at the plant and after the secretary of the administrative board reported that $59,000 could be realized if the state wrecked the plant. The state will retain title to the 800-acre site.

Producer Adds Equipment for Production of Fines

★ The Laura Gravel and Stone Co., Phillipsburg, O., recently made extensive improvements to its plant to permit the production of washed fine material for asphalt road construction. Neff & Fry concrete-stave storage silos, vibrating screens and a crusher were installed.

Gravel Association Returns to Its Normal Schedule

The National Sand & Gravel Association reports that it is making steady progress in returning its functions to the normal schedule for which it was originally organized and which was interrupted to some extent by code matters. Specifications for road-mix bituminous highway construction of the various State Highway Departments are being reviewed and tabulated. It is said that comparison of present specifications with those of previous years reveals a tendency to include requirements for the use of either crushed or uncrushed gravel where formerly they were not mentioned. A report of the status of information on the use of gravel for ballast is also being brought up to date.

Rebuild and Enlarge New York Crushed-Stone Plant

★ The Greene County Crushed Stone Co. has completed the rebuilding and enlargement of its plant at Cairo, N. Y. A Kennedy-Van Saun gearless gyratory crusher, a 30-ton truck scale, a gasoline crane, a washing system and a new system of conveyors, screens, and elevators have been installed. The storage bins were also moved to a new location.

Administration Approves Colorado Permissive Areas

The Administrator, by Administrative Order 109-26, has approved the "permissive" areas set up by the Colorado State Committee. The order became effective July 7 and will remain in effect 90 days.

The areas defined as "permissive" are:

A. Denver Area.—Beginning at southeast corner of Sec. 18, Township 6 south, Range 65 west, westerly to southwest corner of Sec. 16, Township 6 south, Range 70 west; northerly to northwest corner of Sec. 28, Township 1 south, Range 70 west; easterly to northeast corner of Sec. 30, Township 1 south, Range 65 west; southerly to the point of beginning.

B. Pueblo Area.—Beginning at southeast corner of Sec. 35, Township 22 south, Range 63 west, westerly to the southwest corner of Sec. 32, Township 22 south, Range 66 west; northerly to northwest corner of Sec. 5, Township 19 south, Range 66 west; easterly to northeast corner of Sec. 2 of Township 19 south, Range 63 west; southerly to the point of beginning.

★ The Haymon Krupp Products Corp., El Paso, Tex., which was recently chartered to develop a 1200-acre deposit of diatomaceous rock is reported to be refining this material in a new mill in that city.

Government-Projects Cement Contracts Let

CONTRACTS INVOLVE 500,000 BBL.

The government recently placed an initial contract for the cement for the government project at Bonneville, Ore. Of the 300,000 bbl. let at this time 200,000 bbl. were awarded to the Oregon Portland Cement Co., Portland, Ore., and 100,000 bbl. to the Beaver Portland Cement Co., Gold Hill, Ore. The price was $2.02 per bbl. gross in bulk, f. o. b. cars Bonneville, less a cash discount of 10c per bbl. in 15 days.

The Ash Grove Lime & Portland Cement Co., Kansas City, Mo., has been awarded a contract for 200,000 bbl. of cement to be used in the construction of the Fort Peck Dam. It is said that this cement will be supplied by the company's plant at Louisville, Nebr., and that the price was $238,000.00.

Wisconsin Stone Producer Adds Bituminizing Plant

★ The Trap Rock Co., Dresser Jct., Wis., is reported to have completed the construction of an aggregate-bituminizing plant alongside its crushed stone plant at that location.

Recognition of A. F. of L. Ends Indiana Stone Strike

A two-week strike of Bedford, Ind., stone workers was ended July 20 when officials of the Indiana Limestone Corp. agreed to permit four A. F. of L. unions to represent employees. Approximately 3,500 workers were involved in the dispute on whether A. F. of L. or company unions should represent employees in collective bargaining.

★ The Pearisburg Sand & Gravel Co., Pearisburg, Va., recently installed a new Deister Machine Co. Plat-O vibrating screen.

★ C. Wileman & Son are reported to have put into operation a new gravel washing and screening plant near New Manchester, Ind.

NRA Rules Contractors Under Aggregates Code

MUST COMPLY WITH PROVISIONS

The National Recovery Administration, in answer to a letter written by O. T. Reedy of the Colorado State Highway Dept., holds that highway contractors, producing aggregates for their own use on specific contracts, must comply with the provisions of the aggregates code (No. 109). The highway department took exception to the claim that such contractors were included within the code's definition of a producer.

Plant Built for Contract to Operate Commercially

★ The Universal Material & Products Co., Kittanning, Pa., is reported to have purchased a gravel deposit near Tionesta, Pa., and to be erecting a plant. Material will be furnished for a new bridge which is to span the Allegheny River near the plant and for commercial purposes.

Personnel of Limestone Code Authority Approved

The National Recovery Administration on July 21 recognized the personnel of the code authority for the limestone industry and approved the method of selection of its members. On the authority are: Lee Donaldson, vice president, Indiana Limestone Corp.; Wm. B. Headley, president, Walker Bros. Stone Co.; Louis Ingalls, president, Ingalls Stone Co.; John Davidson, secretary-treasurer, Greater New York Cut Stone Contractors' Assn.; Ernest Heldmaier, president, E. Heldmaier, Inc.; B. M. Bettit, vice president, Indiana Limestone Corp.; J. G. Ray, president, Independent Limestone Co.; John Edgeworth, president, Victor Oolitic Limestone Co.; C. H. Owens, president, Texas Quarries, Inc.; J. F. Manning, Jr., president, Rockwood Alabama Stone Co.; Joseph P. Green, manager, Shea & Donnelly Co.; G. E. Hummel, president, David Hummel Bldg. Co.; John Hanert, chairman ex-officio, V. P. Andres Stone & Marble Co.

★ The Chillicothe Sand and Gravel Co., Chillicothe, O., recently expanded its plant for the production of washed asphalt chips. Equipment included Neff & Fry concrete-stave storage silos and screens.

California Cement Plant Installs Dust Collectors

★ The Cowell Lime & Cement Co. recently completed the installation of a system of Ryder dust collectors at its plant at Cowell, Cal., at a cost of about $60,000. This system is said to eliminate more than 80 per cent. of the dust created. This dust had been the subject of litigation between the company and neighboring land-owners.

Producers' Trucks Not Under Trucking Code

It is not necessary for aggregates producers to register under the Trucking Industry code on account of motor trucks operated by themselves for hauling their own products. This word was telegraphed from Washington to Claude L. Clark, executive secretary of Region 8 (Ohio) by Russell Rarey, chairman of the Regional Committee, to answer questions raised by truck-owning producers. Mr. Rarey's statement was confirmed by the Ohio Recovery Administration and by the Columbus, O., office of the Trucking Industry's code organization.

The questions undoubtedly arose from the fact that Art. II, *Definitions*, of the Trucking Industry code (No. 278) includes "vehicles not for hire," as well as "vehicles for hire," within the definition of the industry and specifically exempts only the trucks of farmers, farmers' coöperative associations, and transportation subject to any other N.R.A. code.

Pennsylvania Lime Plant Installs a Gas Producer

★ The American Lime & Stone Co., Bellefonte, Pa., is reported to have completed the installation of a new gas producer at a cost of about $25,000.00. This new unit was added to the two producers already in use to lighten the load on them. No material increase in production is expected but the installation will increase the quality of the lime produced and result in other improvements.

Natl. Crushed Stone Assn. Directors' Meeting Called

A meeting of the Board of Directors of the National Crushed Stone Assn. has been called by President Russell Rarey for Aug. 16. The sessions will be held at The Homestead, Hot Springs, Va., beginning at 10:00 A.M., E.S.T. In addition to the usual business and engineering reports plans will be made for the remainder of the year.

★ The Hilltop Builders Supply Co., Cincinnati, O., recently put into operation a new concrete central mixing plant. Concrete storage silos were erected by the Macdonald Engineering Co. and the Neff & Fry Co. designed the plant and furnished the batching equipment.

Contracts for First Half 1934 Double Last Year's

EXCEEDS 1932 BY 23 PER CENT.

The June record of construction contracts in the 37 Eastern States amounted to $127,131,200 according to F. W. Dodge Corp. This total represents a gain of 24 per cent. over the June, 1933, total of $102,341,900, but a decline of 5 per cent. when compared with the preceding month's total of $134,438,700. This decline, however, is no more than the usual seasonal decline from May to June.

With reference to contemplated new construction, during June there was an increase of almost 30 per cent. in the total volume of intentions to build. The month's total was $313,882,300 as compared with $241,271,200 for May and $386,259,700 for June of last year.

When examining the June contract record on the basis of the source of the funds for construction purposes it is found that there was an increase in the proportion which was publicly-financed. Of the $127,131,200 contract total awarded during June, $73,308,200 was financed from public funds, chiefly PWA. This represents more than 57 per cent. of the total as compared with 53 per cent. of the total for May and 28 per cent. of the total for June of last year.

The first half of 1934 shows a decided improvement over both 1933 and 1932. The cumulative total for the six-months' period this year amounted to $854,320,200 which is almost twice last year's total of $432,113,400 and 28 per cent. greater than the 1932 total of $667,079,200 for the corresponding period. This improvement is emphasized when these three half-year periods are analyzed on the basis of the source of the funds spent for construction purposes. Work privately-financed reached a total of $282,487,100 during the first half of this year as compared with $270,648,600 for the first half of 1933 and $331,904,300 for the first half of 1932. Publicly-financed projects attained a total of $571,833,100 for the first six months of this year as compared with $161,464,800 for the corresponding period of last year and $335,175,400 for the first half of 1932. Improvement, therefore, in the construction industry is under way and an aggressive administration of the National Housing Act should extend this improvement throughout the remaining second half of the year.

Gravel Producer Installs New Bituminizing Plant

★ The Marietta Concrete Co., Zanesville, O., recently put into operation a new Hetherington & Berner aggregate bituminizing plant equipped with a Deister Machine Co. vibrating screen.

New England Factory Leaders Favor Code

62 PER CENT. SAY CODES HELP

Sixty-two per cent. of the New England manufacturers who definitely expressed an opinion on the value of N.R.A. codes to their industries described the various provisions as "helpful," and only 38 per cent. called them "hurtful." This is the result of a questionnaire survey recently made by the New England Council.

The 859 manufacturers who responded to the inquiries addressed to them operate under 140 different codes and employ more than 250,000 workers, or 25 per cent. of the 1,098,514 persons engaged in manufacturing pursuits in New England in 1929. Of these concerns, 157 (18.4 per cent.) are described as "large," 379 (44.2 per cent.) as "medium," and 323 (37.4 per cent.) as "small." Of the 572 plants which supplied data on the number of their employees, 98 "large" plants employed 118,850 workers (1,212 each), 165 "medium" plants employed 57,953 (349 each), and 309 "small" plants employed 17,871 (58 each).

On nine principal questions the total votes cast numbered 6,182, or an average of 687 per question. Of these, 2,853 (46 per cent.) describe the various N.R.A. provisions as "of no effect," a refuge apparently taken either: (1) by those who had insufficient information to warrant forming a judgment, or (2) by those whose political sympathies were strong enough to restrain them from characterizing as "helpful" any legislation enacted by the present administration but whose information was not sufficiently conclusive to warrant a vote of "hurtful."

If these "noncommittal" votes be eliminated, the 3,329 definitely expressive votes remaining show 2,078 (62 per cent.) in the "helpful" column and only 1,251 (38 per cent.) in the "hurtful" column.

A study of the voting on separate question shows some interesting views.

On the question of whether the codes have been of value in eliminating unfair competition 375 (84 per cent. of those voting) answered "helpful" and 71 (16 per cent.) "hurtful" —a 5-to-1 ratio.

In reducing and relieving unemployment 398 (85.5 per cent.) found the codes "helpful" and 67 (14.5 per cent.) "hurtful" — almost a 6-to-1 ratio.

On the maximum-hours-of-labor provisions 257 (40.6 per cent.) voted "helpful" and 375 (59.4 per cent.) "hurtful." The preponderance of "hurtful" votes is probably due to the large number of seasonal industries in New England.

Minimum rates of pay are considered "helpful" by 340 (67 per cent.) and "hurtful" by 165 (33 per cent.)— a "helpful" -"hurtful" ratio of more than 2 to 1.

On the value of wage differentials the vote was more nearly equally divided between "helpful" and "hurtful," the former registering 103 votes (46 per cent.) and the latter 121 (54 per cent.) The total vote, 224, was very light.

A strong negative attitude toward labor is shown by the vote on the collective-bargaining provisions. The "helpful" vote was only 31 (17 per cent.), while the "hurtful" vote was 146 (83 per cent.) — nearly a 5-to-1 ratio.

Provisions for limiting production capacity are generally regarded as "hurtful" (205 votes or 72 per cent.), while only 78 (28 per cent.) call them "helpful."

Many manufacturers consider the selling-below-cost restrictions "helpful" (271 votes or 86 per cent.), while only 43 (14 per cent.) consider them "hurtful"—better than a 6-to-1 ratio.

The price-stabilization plan is described as "helpful" by 225 (79 per cent.) and as "hurtful" by 58 (21 per cent.) — a favorable-to-unfavorable ratio of nearly 4 to 1.

Winthrop L. Carter, chairman of the Council's Industrial Committee, in summarizing the results of the survey, draws the following conclusions:

1. Eighty per cent. of the New England manufacturers regard some form of business code permanently desirable or essential.

2. Large, medium and small concerns are all about equally satisfied with compliance. In all cases about 60 per cent. of those voting are satisfied.

3. In all three groups the vote is in favor of eliminating limitations on production capacity.

Stone Producer Installs New Hammermill Crusher

★ The Hess Stone & Supply Co., Waynesboro, Pa., recently completed the installation of a new hammermill crusher. This unit was added to permit the production of finer sizes of stone and dust for which there is a growing demand.

New Kentucky Highway Awards Reach $950,000

★ W. C. Hill is reported to have completed the construction of a new sand and gravel crushing, screening and washing plant near Independence, Ore.

Contracts calling for the expenditure of $950,000.00 for road construction and improvements were awarded July 10 by the Kentucky State Highway Commission. Most of the contracts awarded were for surfacing, grading and drainage. Some bridge construction contracts were also included.

PWA Road Work 94.3% Under Way or Finished

300,459 MEN NOW EMPLOYED

Progress made on the emergency construction of public-works highways up to July 21 under the supervision of the United States Bureau of Public Roads shows a total of 8,263 projects, estimated to cost $404,189,000, had been advertised for contract, begun by day labor employed directly by the highway authorities, or completed. The cost of the day-labor projects included in the above is estimated at $30,128,000.

Of the 7,961 projects awarded for construction, 4,615 were under construction on July 21 and 2,907 were completed. The work under construction, which is estimated to cost $273,626,000, was giving regular employment to 300,459 men.

In the whole country work under way and completed involved 94.3 per cent. of the $400,000,000 provided for public works highways under Sec. 204 of the National Industry Recovery Act.

Lime Districts 7 and 12 to Hold Chicago Meeting

E. M. Benish, secretary of Districts 7 and 12 of the lime industry has called a meeting to be held at the Bismarck Hotel, Chicago, Friday, Aug. 10, 1934. The purpose of this meeting is to endeavor to formulate a satisfactory marketing plan to govern the sale of high-calcium, chemical and industrial lime within the state of Ohio, and for the sale from producing points in District 5-B to destinations in adjacent districts. This matter was originally discussed at the meeting held by various manufacturers at Indianapolis, June 4. It is the desire of those calling this meeting to have as many manufacturers as possible attend.

Indiana State Rock-Wool Plant Destroyed by Fire

A fire originating in the rock wool and furniture factory of the Indiana State Farm at Putnamville, Ind., June 30, destroyed the building and its contents with an estimated loss of $50,000.

★ The Arkhola Sand & Gravel Co., Ft. Smith, Ark., recently purchased a double-screw gravel washer from the Eagle Iron Works, Des Moines, Ia.

★ The Armour Fertilizer Works recently purchased a Porter steam locomotive and 10 Western dump cars for its phosphate plant at Mt. Pleasant, Tenn., from the Birmingham Rail & Locomotive Co.

Mines Bureau Names 1933 Safety Winners

MICHIGAN LIMESTONE WINNER

The winners of the National Safety Competition of 1933, in which recognition was given to notable safety records attained during the calendar year 1933 by numerous mines and quarries, have been announced by Scott Turner, Director, United States Bureau of Mines, Department of the Interior, which sponsored the contest. Three hundred and thirty-two mines and quarries in 35 states participated in the competition, and outstanding accomplishments were achieved in the operation of mines and quarries without accidents or with quite low accident rates in 1933. The competing companies were divided into five classes: anthracite mining companies, bituminous-coal mining companies, metal mining companies, operators of nonmetallic mineral mines other than coal mines, and quarries or open-cut mines. A duplicate of the bronze trophy, "Sentinels of Safety," donated by the *Explosives Engineer*, was awarded to the winning company in each group.

In the nonmetallic mineral group, first place was given to the Retsof rock-salt mine, of the Retsof Mining Co., Retsof, N. Y., which was operated through 265,120 man-hours in 1933 without a lost-time accident. This mine also was given the highest award in this group in 1929, 1931 and 1932.

In the group composed of quarries and open-cut mines, the winner was the Rogers City limestone quarry, Rogers City, Mich., operated by the Michigan Limestone & Chemical Co., which worked 595,416 man-hr. in 1933 with no lost-time accidents. This quarry also was given the highest award in this group in 1929 and 1932.

Among the nonmetallic mines the following were honorably mentioned:

Columbia Quarry Co., Valmeyer, Ill.
Crescent Portland Cement Co., Wampum, Pa.
Medusa Portland Cement Co., Mt. Holly Springs, Pa.
Missouri Portland Cement Co., Independence, Mo.
Pittsburgh Plate Glass Co., Crystal City, Mo.
Universal Gypsum & Lime Co., Akron, N. Y.

In the group comprised of quarries and open-cut mines the following-named operations were given honorable mention for having had no lost-time accidents in 1933:

Alpha Portland Cement Co., Catskill, N. Y.; Martin's Creek, Pa.
American Lime & Stone Co., Tyrone, Pa.
J. E. Baker Co., White Hall, Md.; Billmeyer, Pa.; Mt. Wolf, Pa.
Edward Balf Co., Newington, Conn.
Bethlehem Mines Corp., Bethlehem, Pa.; Bridgeport, Pa.; Hanover, Pa.; Naginey, Pa.
Cleveland Quarries Co., Amherst, O.
Columbia Quarry Co., St. Clair County, Ill.
Connecticut Quarries Co., Inc., Cheshire, Conn.; Middlefield, Conn.
Coplay Cement Mfg. Co., Coplay, Pa.
Florida Portland Cement Co., Brooksville, Fla.
General Crushed Stone Co., Akron, N. Y.; Auburn, N. Y.; Oaks Corners, N. Y.
Hercules Cement Corp., Stockertown, Pa.
Inland Lime & Stone Co., Manistique, Mich.
Lawrence Portland Cement Co., Thomaston, Me.
Lehigh Portland Cement Co., Birmingham, Ala.; Lawrence County, Ind.; Mason City, Ia.; Union Bridge, Md.; Fogelsville, Pa.; Ormrod, Pa.
Lone Star Cement Co. Indiana, Inc., Greencastle, Ind.
Lone Star Cement Co. New York, Inc., Greenport, N. Y.
Lone Star Cement Cement Co. Pennsylvania, Nazareth, Pa.
Louisville Cement Co., Speed, Ind.
Maine & New Hampshire Granite Co., Conway, N. H.
Marquette Cement Mfg. Co., Cape Girardeau, Mo.
Missouri Portland Cement Co., Ruegg, Mo.
North American Cement Corp., Martinsburg, W. Va.
Pembroke Limestone Corp., Pembroke, Va.
Pennsylvania-Dixie Cement Corp., Nazareth, Pa.; Richard City, Tenn.
Petoskey Portland Cement Co., Petoskey, Mich.
Pittsburgh Plate Glass Co., East Fultonham, O.
Santa Cruz Portland Cement Co., Davenport, Cal.
Southern Mineral Co., Winnfield, La.
Southwest Stone Co., Stringtown, Okla.
Union Limestone Co., Hillsville, Pa.
Valley Forge Cement Co., West Conshohocken, Pa.

The National Safety Competition of 1933 revealed a larger number of accident-free mines and quarries in proportion to the total number enrolled than in any previous year, Mr. Turner commented. The contest also revealed a greater number of plants whose accident rates were remarkably low.

Illinois Lets Contracts for 170,000 Bbl. Cement

The three La Salle and Oglesby, Ill., cement mills have received a big share of state and Cook county highway cement lettings, receiving, in all, orders for 170,000 bbl. Of the total allocated these plants, the Marquette Cement Mfg. Co. was given an order for 75,000 bbl. by the state and 55,000 bbl. by Cook County, or an aggregate for this mill of 130,000 bbl., while the Alpha and Lehigh companies each got an order for 20,000 bbl.

The Medusa Portland Cement Co., operating a mill at Dixon, Ill., was given a 25,000-bbl. order by the state and a 24,000-bbl. order by Cook County, this business being sufficient for 30 days' operation of the plant.

The big allocation given the Marquette, it is learned, is equal to 20 days' operation on the present production basis, which is 8,500 bbl. a day.

Colorado Flourspar Mine Installs New Equipment

★ The Salida Fluorspar Co. has installed considerable new equipment at its fluorspar mines in Brown's Canyon near Leadville, Colo. Included are a compressor, hoist, crusher and washer. Frank A. Mansheim is manager of the company.

Regard Housing Act as Spur to Home Building

ASK CUT IN MATERIAL COSTS

According to the *Wall Street Journal*, building-material manufacturers and equipment dealers see in the National Housing Act the groundwork for substantial pick-up in home building and modernization and regard the permanent features of the act as the long-desired stabilizer of the building and home mortgage business.

It is impossible to forecast the probable effect of the measure with any accuracy. However, building leaders generally are of the opinion that a conservative estimate of its effect during the first year would be an increase over 1933, the low point for the depression, of about 40 per cent. They say also that continued business improvement during the next year would boost residential building about 50 per cent.

Combined, therefore, the effects of the housing bill and business improvement may serve to bring home building to a total of about $473,000,000 during the next year as compared with $249,262,100 in 1933. This increase, together with the general expansion anticipated in the semi-public and public works and in utility and industrial building should substantially increase the volume of building material sold.

It is pointed out, however, that home building in particular is dependent upon some reduction in construction costs. Thus far the reduction has been sought in cost of materials. While builders and those in touch with the industry point out that over 60 per cent. of the cost of building a house goes to labor, whose pay rates are somewhat less than at the peak period in 1928 and 1929 but still higher relatively than the cost of building materials, leaders in the building material industry state that the prices of materials should be cut. In view of the National Administration's attitude with respect to preserving or raising the levels of pay, it is doubtful that rates paid building mechanics will be reduced to any great extent.

An increase in construction should provide opportunity for all material producers to boost earnings, notwithstanding some reduction in prices for their products because costs of production have been drastically reduced during the depression.

Indiana Gravel Producer Installs Dredging Ladder

★ The Bedford Nugent Co., Inc., Evansville, Ind., recently installed an Eagle Iron Works Swintek screen nozzle ladder. Unlike most other ladder installations this unit is supported on a new barge separate from the pump boat.

Code Amendments Offered at NRA Meet

DISCUSSCONTRACTOR-PRODUCER

Vigorous defense of the budget for administering the code for the crushed-stone, sand-and-gravel and slag industries, and opposition to various amendments proposed by N.R.A. advisory boards, was voiced by Otho M. Graves, chairman of the Code Authority for those industries, before an N.R.A. hearing July 17.

The budget, which totals $1,133,-404, includes $238,100 for support of the Code Authority and $875,304 for expenses of administering the code by regional, district, state and division committees.

Mr. Graves testified that this cost represented the same amount which the leading trade associations of the industries required to carry on their activities. He pointed out that the Code Authority necessarily must engage in far more activities than these trade associations and thus was doing more work for the same amount of money. The $1,000,000 budget, he contended, was not out of proportion to the $160,000,000 annual sales value of the industries' products.

An amendment, which in effect would give the Code Authority power to assess all members of the industries for contributing to the expenses of the budget, was proposed by Mr. Graves. He explained that up to now only "registered" members of the industries have been paying for the code administration as well as for its establishment. These "registered" producers are those members of the industries who thus far have assented to the code.

"We feel that the time has come, however, when it is unfair to continue to raise the budget funds voluntarily," Mr. Graves declared.

He assured the N.R.A. group that the code authority did not plan to assess those members who heretofore have failed to come under its provisions for the cost of the code's establishment. He said the "registered" members already had borne this expense.

Asked by members of the N.R.A. boards to explain the methods of computing the assessments on members, Mr. Graves said that tonnage figures for 1932 were used to determine each member's share of the code expenses.

"Personally," he stated, "and not speaking for the Code Authority, if we could base the assessments on net sales it would be the ideal way. It has been found, however, that the companies hesitate to disclose their sales figures. We find that they give even their tonnage figures reluctantly."

The various districts and regions were left to determine for themselves the method of raising the budget funds and its disbursement, he added.

Turning to objections which have come from many contract-producers against inclusion under the code, Mr. Graves said that they should be subject to the code provisions. These contract-producers at certain times may have a contract which calls for the spreading of thousands of pounds of materials but does not provide for any construction work, he explained. In these cases the Code Authority seeks to have them classified as producers and thus made subject to assessments of the code.

"In regions of the South, Southwest and the West considerable revenue comes from this class," he testified. "The portable-plant operator also should be made subject to the code provisions."

Taking up the proposed amendments to the code offered by the Labor Advisory Board, Mr. Graves presented unalterable opposition of the Code Authority to the bulk of them.

The first amendment offered by the labor body would limit the daily working hours of any employee of the industry to 8 hr. The code provides a maximum of 40 hr. weekly. Mr. Graves objected to the 8-hr. day limit because of the dependency of the industries on weather conditions. He argued that a contractor would suffer hardship under the amendment should there be several days of inclement weather and he could not work his employees the maximum 40 hr. in the remaining days.

Mr. Graves described as "abhorrent and disastrous" the proposed labor board amendment providing that at least 1½ times the normal rate shall be paid for all work time in excess of 8 hr. a day or 40 hr. per week. He also objected to the amendment which would make $14 the weekly minimum wage for salaried employees throughout the country. Under the code these salaries taper down according to population.

Summarizing his opposition to the labor amendments, Mr. Graves declared the code as drawn represented a compromise between the labor group and the members of the Code Authority.

"I admit the code as drawn does not represent the full accord of all the members of the industries," he stated. "It also is not satisfactory altogether to the rank and file. We realize that the formation of a code is a question of give and take. These labor board amendments, however, are not new. They are the same ones that were presented while the code was being formulated. The code as drawn represents a consonance of the views of the labor board and our own. Now we are asked to depart from this agreement and move over to the board's original proposals."

Burt L. Knowles, of the executive committee of the Associated General Contractors of America, appeared next to oppose termination of an executive order which exempts members of an industry from contributing to the administrative expenses of any code other than the code which embraces his principal line of business.

He said that his association recognized the fact that the commercial production of mineral aggregates is an essential industry capable of serving many communities in a highly efficient and economical manner. It also realized, he continued, that in many localities unregulated and unbridled competition has proved to be highly destructive to this industry and has in many instances rendered it incapable of performing this service which under reasonably-favorable competitive conditions it certainly can perform. He contended that the construction industry in many localities required this service and desired to do everything in its power to foster and aid it in every way in order that it might be reëstablished on a profitable basis.

On the other hand, he asserted, there are other localities where to all intent there is no such thing as the commercial production of those mineral aggregates. He said in many sections of the country the commercial plants are located at great distances from each other and from the construction operations which may be carried on in such regions. These localities are mainly to be found in the South, the Middle West and the West, he stated. He said that in many instances large construction operations, notably highway work, were carried on 50 mi. and more from the nearest railroad and perhaps farther than that from any commercial aggregates plant.

"Is it not clear," Mr. Knowles said, "that under such circumstances the production of mineral aggregates by the general contractor becomes a natural function and an essential and integral part of his business of general contracting? Such a contractor, when faced with these conditions can not be said to be encroaching upon the field of any established industry. He is simply operating under the stern necessity of economic pressure. It is perhaps more often the case than not that he is compelled by the provisions of specifications under which he operates to use local materials from definitely specified pits or quarries. In such cases, and there are many, it is manifestly unfair to enforce upon that contractor the provisions and administration fees of the code of an industry which as far as he is concerned is non-existent."

He said that it should be entirely clear that because of the widely varying conditions which prevail in the different states and localities it is not reasonable or practicable to hand down a single ruling which would be equitable and fair in all regions alike.

"In localities," he continued, "where the commercial plants by virtue of their economical operations, their number and their railroad and other transportation facilities, can serve the contractors, at less cost and with sufficient speed, materials of uniform and

superior quality, code regulations governing alike the commercial and contractor producer might be very well established.

"On the other hand, the circumstances surrounding the comparatively-isolated contractor, that is, isolated as far as any reasonably-accessible commercial source of supply of mineral aggregates is concerned, demand equally-fair consideration. Such a contractor should, we claim, be exempted from compliance with the code for the crushed-stone, sand-and-gravel and slag industries."

The industry, he concluded, is now engaged in the establishment of permissive areas and it would appear that, coincident with this activity, some districting or area agreements could be developed which would establish fair competitive conditions, in such localities as can be economically served by commercial producers, and proper exemptions in other localities.

The termination of the exemption also was opposed by Richard Elliott, representing the National Assn. of Portable Stone, Sand & Gravel Producers.

"A large number of the portable producers in the United States are classified as contractor-producers because they produce aggregate for the completion of contracts which they themselves hold," Mr. Elliott testified. "If these contractor-producers are required to pay assessments to support the Code Authority for the crushed-stone, sand-and-gravel, and slag industries and their subordinate committees and also assessments to support the Code Authority for the construction industry and its subordinate authorities, these contractor-producers will be required to support financially a minimum of six organizations established under these codes and a maximum of eight or more. We can not feel that the N.R.A. would permit such a ruinous burden to be placed on the shoulders of the contractor-producers."

Mr. Elliott then said that his organization asked that, if it was decided to approve a termination of the exemption which is sought by the Code Authority for the crushed-stone, sand-and-gravel and slag industries, contractor-producers be exempted from paying the assessments levied by the construction-industry Code Authority and its subordinate authorities.

A number of protests against the budget submitted by Mr. Graves for the industries he represented, as well as the methods of contribution by the members, were read into the record by Assistant Deputy Administrator R. E. Plimpton, who presided over the hearing. Other amendments, besides those proposed by Mr. Graves and the Labor Advisory board, were submitted.

The Consumers' Advisory Board of the N.R.A. submitted code amendments which would eliminate any provision forbidding selling below cost except in an emergency due to destructive price-cutting, and which would require all members of the industries to file open price lists. Certain restrictions also would be placed upon price changes.

An amendment proposed by the N.R.A. Division of Research and Planning would force the Code Authority to formulate methods of cost finding and accounting capable of use by all members of the industries and to submit such methods to the administrator for review. If approved by the administrator, full information concerning such methods shall be made available to all members of the industries. Thereafter, each member will be permitted to utilize such methods to the extent found practicable.

Crushed-Stone Producer Rebuilds Entire Plant

★ J. R. Wallis, Dubuque, Ia., announces the expansion of his stone quarry at Horseshoe Bluffs, south of that city on the Mississippi River. New crushing, screening and conveying equipment has been installed. The company has contracts to supply crushed stone for government lock and dam construction on the river, the material being shipped by barge.

Ohio Makes Progress on Permissive-Area Studies

The Ohio State Committee announced on July 11 that, in accordance with the provisions of Sec. 5 of Art. VII of the Code of Fair Competition for the Crushed-Stone, Sand-and-Gravel and Slag Industries, it had completed its study of production facilities in Ohio, had conducted a public hearing, and filed with the Regional Committee of Region 8 (Ohio) the results of its findings and a copy of a map showing the proposed "permissive" areas. The following areas have been marked out:

1. Hamilton and Clermont Counties.
2. Preble County.
3. Warren County.
4. Greene (east of main line and Springfield branch of Cincinnati Division of Pennsylvania Railroad), Fayette, Clinton and Highland Counties and part (south of north and west lines of Concord Township, north of main line of Ohio Division of Baltimore & Ohio Railroad, west of east line of Buckskin, Paint and Paxton Townships, north of State Highway 258 and west of State Highway 124) of Ross County.
5. Adams County. (Although part of the original map of proposed areas, this does not appear on the latest map, Exhibit 40.)
6. Scioto County.
7. That part of Ross County not included in Area 4.
8. Medina County. (Although shown on the original map of proposed areas, this does not appear on the latest map, Exhibit 40.)
9. Allen, Anglaize and Mercer Counties.

★ The Sterling Crushed Stone Co., Sterling, Mass., recently purchased a 10-in. by 36-in. jaw crusher from the New England Road Machinery Co., Boston, Mass.

July Plant Reopenings Show Steady Demand

OTHERS PLAN EARLY RESUMPTION

That the demand for cement is holding up unusually well for this time of the year is indicated by the fact that few cement plants were shut down during July and that a number of others went into operation. The following plants are reported to have resumed operation during the month: Three Forks Portland Cement Co., Trident, Mont.; Olympic Portland Cement Co., Bellingham, Wash.; Pennsylvania-Dixie Cement Corp., Kingsport, Tenn. Other plants planning to reopen soon are: Lone Star Cement Co., Kansas, Bonner Springs, Kans.; Lehigh Portland Cement Co., New Castle, Pa.

Settle Ohio Lime Strike Without Recognizing Union

Strikers at the plant of the Herzog Lime & Stone Co., at Forest, O., voted on July 27 to return to work. They walked out on May 23, asking for an increase in wages and recognition of the International Quarry Workers' Union of North America. The company refused to recognize the union on the ground that it represented only a fraction of the employees. The Regional Labor Board at Cleveland intervened and obtained an agreement made between the company officials and the labor board setting forth a schedule of wages and working conditions to which the company agreed for a period of approximately one year. This agreement does not recognize any union either directly or by implication, and is not an agreement between the company and its employees, but between the company and the labor board. The wages to be paid are virtually the same as those that were being paid at the time the strike was called, beginning at 44c per hr. for common labor. While union officials were holding out for a contract with the union, the rank and file of the strikers were said to be anxious to accept the proposal as other strikes in northwestern Ohio have not resulted in any increase in the wages of common labor.

A meeting at Carey, O., called by the business men of that place in an effort to work out a settlement of the strike at the Carey plant of the National Lime & Stone Co, was broken up by outsiders. This is the only plant in the finishing-lime district of Ohio that is now closed on account of labor disputes.

★ The Tennessee Valley Authority has purchased 5 Ford 1½-ton hydraulic-dumping trucks. These machines use the standard Ford 8-cylinder engine. They are to be used in connection with the construction work on Norris Dam.

Proposed Code Changes Disturb Cement Makers

SELLING TERMS ARE CRITICIZED

The same lack of accord which has attended for more than a year the efforts of the National Recovery Administration to whip a code of fair competition into shape for the cement industry prevailed at the hearing on July 11 before Divisional Administrator Barton W. Murray on the proposal to restore Article XI, dealing with the method of selling and marketing the product.

The code was originally proposed almost a year ago and was approved by the President Nov. 27, 1933. No sooner had the document gone into effect than the Builders' Supply Industry and others lodged earnest protests, with the result that a hearing was held Jan. 15 on the proposal to eliminate parts of the provision controlling methods of selling and marketing.

On Jan. 23 decided modifications were made by Administrative Order No. 128-4, which, in fact, left little of Article XI, except a fair-trade-practice feature of a general nature, and a provision that cement should be marketed on the basis of a barrel weighing 376 lb. net, and be delivered in cloth or paper sacks, four of 94 lb. net weight to constitute a barrel, according to weight at the plant or *en route* to the point of delivery.

The amendment presented on July 11 was in reality a new Article XI, in the preparation of which it was easily discernible that the cement and the builders' supply industries had got together. Moreover, it was early apparent that, with almost innumerable federal projects under way and soon to be started, the government had availed itself of the opportunity to endeavor to secure cheaper cement for construction and, in addition, to establish the basing point at the factory instead of the destination or place of use.

After B. H. Rader, chairman of the cement code authority, had stated that the amendments spoke for themselves and had been worked out after careful study, Major J. S. Brogdon, of the United States Engineers, submitted a proposal that Par. 2, of Article XI, under discussion, be extended to read, "except that the United States Government, or state where United States funds are being employed, may be granted exceptions to selling or marketing provisions," with the added statement that "there shall be no discrimination between purchasers of cement on account of their geographical location." He also asked 30 days for payment instead of 15 for shipments on account, that all Par. 9, which stipulates that sales be made through dealers, be eliminated, and that nothing be embodied that would prevent sales on an f.o.b.-mill basis. He added that the government engineers were in accord with the amendments proposed by the Consumers' Advisory Board of the N.R.A. He recommended that railroad tariffs be enforced in such a way that the government would have the right to divert shipments in accordance with work requirements.

The first emphatic protest against the proposed amendment came from Stanton Walker, executive officer of the Committee on Organization of the ready-mixed concrete industry, who declared that the amendment would be disastrous to ready-mixed-concrete companies generally. Pointing to Par. 7 and 8, he declared that they were diametrically opposed to the intent and purpose of the recovery law and would defeat the purpose of the ready-mixed-concrete code. These two paragraphs read:

> "7.—Except as otherwise specified, cement shall be marketed in each community through dealers regularly serving such community.
>
> "8.—*Definition of a dealer.* A cement dealer as used herein is one who has an established place of business where he is regularly engaged in promoting the use and sale of cement and other building supplies to the public with facilities to serve the retail trade in a given territory and able and willing to perform all functions devolving upon him in securing, performing, and protecting orders and contracts for the delivery of cement on his own account."

"This simply means that the ready-mixed-concrete industry would be compelled to buy its cement from the building-supply industry, which is its out-and-out competitor," said Mr. Walker. He then pointed out that the ready-mixed-concrete industry is a service industry, and explained that concrete is mixed at an established plant or *en route* to the place of use. He stated, further, that such a provision would be nearly disastrous to 350 or more mixed-ready-concrete concerns in the country, who have built up established businesses and are able to meet all demands. He read excerpts from a number of letters written by concrete companies who protested against the sections, and said that of 101 heard from after sending out a questionnaire, 76 reported that they were unalterably opposed to Par. 7 and 8, and that those who favored such a proposal had been found to have builders' supply affiliations.

Others who protested along the same lines as did Mr. Walker, were J. H. Dixey of the Transit Mixed Concrete Corp. of New York, Alexander Johnson of the Central Concrete Mixing Corp. of Brooklyn, G. Sheinin of the Colonial Sand & Stone Co. of New York; H. F. Thomson of the General Materials Co. of St. Louis, J. E. Burke of the Ready-Mixed-Concrete Division of J. K. Davison & Bros. of Pittsburg and chairman of the Code Authority of the ready-mixed-concrete industry, Arthur C. Avril of theAvril Tru-Batch Concrete, Inc., of Cincinnati, J. L. Shiely of the Guaranteed Concrete Co. of St. Paul, and others.

All protested against the provision that would force them to buy from the dealer, and insisted that they be permitted to continue to buy cement from the factories as has been the custom for years.

Paul David of the Knoxville, Tenn., headquarters of the Tennessee Valley Authority, stated that the Authority is now negotiating with cement manufacturers in a position to supply its cement requirements in an attempt to reach an agreement which will control the price to be paid by the Authority for cement during the next five years or more.

"It is the position of the Authority," said Mr. David, "that the specific work for which cement is to be used and the locations of the projects have nothing to do with the fair prices for cement at the mills. Fair prices should be based upon costs of production in efficient mills, with reasonable allowances for returns to management and capital."

B. L. Knowles, executive assistant of the Associated General Contractors of America, protested also against Par. 10 of the amendment, which defines the classes of buyers given contract protection. Mr. Knowles termed the amendment "confiscatory and unjust," and attacked what he termed the "mark-up" price system, which he said was in vogue.

Representatives of the P.W.A. urged that f.o.b.-mill prices be adopted.

John Frey of the Labor Advisory Board urged higher wages and greater safety for employees, while labor representatives asked for shorter hours and higher pay generally in the industry.

Other speakers followed, and those who did not do so at the time, were asked to file briefs at once, so that the N.R.A. experts could begin an intensive study of the proposal and objections, along with suggestions for changes in the amendment.

Charles F. Conn, president of the Cement Institute, said in part by way of conclusion:

"Article XI which we came here to discuss deals with methods of selling and marketing cement. It constitutes economic planning in the field of distribution. Its aim is to bring order out of chaos; to establish methods of marketing cement which are fair alike to buyer and seller; to protect the legitimate rights and privileges of our various classes of customers under the different conditions which prevail in our industry. This Article has no relation to price fixing; it involves no attempt to set up monopolistic practices. On the contrary it seeks a square deal for all. . . .

"The Labor Advisory Board would delete parts of Art. III and part of Art. X, and would add seven new provisions to Art. III. The Consumers' Advisory Board would delete five sections of the proposed new Art. XI, all Art. VIII, practically all Art. IX, and

two sections of Art. X, and would rewrite Art. VIII and IX for us and add a new section to Art. XII, which in effect would eliminate the whole article from the code. The Legal Division would make changes in twelve parts of our code, affecting Art. I, II, III, IV, X and XII. . . . If our code is to be altered in all these particulars, then it will cease to have any semblance to a voluntary code. We submit that this is the fundamental issue.

"Perhaps we have misunderstood the purpose of our code and the intent of the Act. The N.I.R.A., as we understand it, was based upon a recognition of national emergency. The act declares the policy of Congress, which was, in part, 'to provide for the general welfare by promoting the organization of industry for the purpose of coöperative action among trade groups.' If there is to be an end to voluntary codes there is an end, too, of any attempt to fulfill this purpose of coöperative action among trade groups.

"This consideration is broader than the merits of any specific proposals. If the N.I.R.A. is to be effective in accomplishing any of its aims—and the cement industry is sincerely desirous of promoting all of them—the codes of fair competition must, we believe, reflect the *bona fide* efforts of industries to govern themselves. If a code represents a plan of real self-regulation it will in large part succeed in rehabilitating industry and in accomplishing those other policies of the act; if, on the other hand, voluntary regulation is to be supplanted by imposed regulation, then we gravely doubt that the act or the codes will work.

"When we insist that the N.R.A. codes must essentially constitute charters of self-regulation we, of course, do not mean that industry can 'write its own ticket' to pursue a selfish purpose. The act itself requires that certain provisions be written into codes and restricts the nature of the other provisions. Writing a code, we admit, is a process of give and take. But this process began when we presented our code a year ago. At that time some of the provisions that our industry wanted were given to us. But also at that time many of the proposals we made were denied us at the instance of the N.R.A. divisions and advisory boards, which now want to take away from us most of what remains of our voluntarily submitted proposals. Does the give-and-take process mean that the industry does all the giving and the N.R.A. does all the taking?

"Nor can we disregard the fact that the give-and-take process has been going on in the same one-sided way through executive orders and administrative regulations. A series of executive orders has chipped away at these code structures in which industries have been housed and at last the foundations of these structures were all but blasted by the executive order of June 29. This last order affects all members of industries operating under open-price plans—that is, fully half of all the industries operating under codes. The order invites members of these industries to bid 15 per cent. under the price which they had posted. The whole purpose of the open-price plan is to reveal all competitive facts that competition may be exerted openly, fairly, and intelligently. This order invites a return to primitive and unintelligent methods of competition.

"The uncertainty, misunderstanding, and confusion resulting from this order are bound to be followed by a series of interpretations, and this phenomenon leads to another serious consideration. No one can be expected to play the game when the referee continually changes the rules. . . .

"While the great majority of other industries established a 40-hr. week, the cement industry set its maximum time for factory workers at an average of 36 hr. a week, thus anticipating the President's March request for a 10-per cent. reduction in the 40-hr. week. In wages, too, we have done our share by setting a scale substantially above that which prevailed prior to the code, and which in some plants means hourly wages at higher rates than had ever been paid before. Furthermore, the cement industry voluntarily established these hours and wages more than four months before the effective date of the code. And all this was done by these suppliers of capital goods and construction materials which suffered so drastically by the depression. These rates and hours for labor we can not continue to assure if further burdens cast us deeper into costly chaos.

"First, the representatives of the cement industry are here for the specific purpose of reinstating Article XI as an integral and necessary part of our code.

"Second, our industry can not afford to continue to pay the code wages or to abide by the curtailed working hours if we are to be stripped of the means to pay these increased costs.

"Third, every proposed amendment and every executive and administrative order makes us less able to pay these added costs.

"Fourth, when the N.R.A. confronts us with proposals for a wholesale rewriting of our code, we feel impelled to stress fundamentals; to point out that one of the purposes of this emergency legislation was to encourage members of an industry to regulate themselves by proposing a code of their own devising, reflecting the aims of the industry itself, expressed in terms familiar to the trade, adapted to the problems peculiar to that group, and fair to all concerned.

"Fifth, we believe that N.R.A. codes will succeed only to the extent that those who are bound thereby will and can abide by them and make them respected. The failure of N.R.A. to do anything to assist industry in the enforcement of trade-practice provisions makes it doubly clear that the fate of this experiment in codes rests in the success of self-regulation.

"Sixth, we urge the Administration to give our industry a fair chance at self-regulation. In the midst of frequently-changing orders, rules and regulations it has taken six months for the members of our industry to learn how they may avoid violation of their code. Now we ask a chance to give it a trial!"

Division Administrator Murray replied to this statement by saying in part:

"You have raised a question which I think should be answered here while it is clear in the minds of those of the industry who are present. You have my personal assurance that nothing will happen to the code, so far as my responsibility extends, that does not have the complete assent of the members of the industry who have been delegated by the industry to administer the code. . . . What surprises me, Mr. Conn, is your assumption that these are other than proposals, inasmuch as it clearly states that these are amendments submitted by the Labor Advisory Board as proposed, and also submitted by the Legal Division. They are proposed, not imposed."

Montana Cement Maker Modernizes Entire Plant

The plant of the Three Forks Portland Cement Co. at Trident, Mont., was reopened recently following a 2-month period of reconstruction during which a large part of the plant was modernized and rebuilt. According to B. J. Latimer, superintendent, 250 men were employed on this work for ten weeks and $150,000 was spent, principally for labor. During this period nine reinforced concrete storage silos were built which have a combined capacity of 125,000 bbl. of cement.

Dept. of Justice Reviews Non-Compliance Claims

Two complaints of non-compliance with the provisions of the aggregates code (No. 109) on the part of producers in the 14th region (Colorado, Wyoming, New Mexico, Utah and Arizona) have been filed. They are now under review by the Department of Justice in Washington.

★ The Minnesota Mining & Mfg. Co., 1015 S. Second Ave., Wausau, Wis., is reported to have let contracts for a $150,000.00 crushing and screening plant, an office building, a warehouse and shops.

★ The Citrus Rock Co., which was recently organized in Inverness, Fla., under the management of J. C. Johnson, Tampa, is reported to have leased a quarry 10 mi. south of Inverness. It is announced that a rock crushing and screening plant to cost over $100,000.00 will be built.

News of the N.R.A.

Weighted Average Costs

Price determination based on weighted average costs will undoubtedly create a situation destructive of all chance for a speedy return to a normal market for quarry products and for commodities generally, in the opinion of W. L. Chandler of the N. R. A. Consumers' Advisory Board, who is leading a drive for rejection of that provision in all codes.

Averaging of costs penalizes the efficient operator and is unfair to him for the reason that it takes from him his inherent right to obtain business on the basis of his efficient operations, Mr. Chandler argues. It also has the capacity, he points out, to destroy the quarry where operations just can not be carried on within the cost range found in competitors' plants.

Mr. Chandler and his associates, who represent the group whose interests the National Recovery Administration has been most zealous to protect, are campaigning for definite cost formulas for all industries, but the weighted-cost feature is definitely "out," so far as they are concerned.

Of course, the power of the consumers' board is merely an advisory one; it can not veto anything that the trade adopts with the approval of the Administration. However, due to the very definite relationship between sale prices and the consuming public, the board has been sustained on numerous points of its cost and sales policy.

Weighted, or average, producing costs carry into the price equation the operations of plants of low efficiency with consequent high prices. Hearings before the N. R. A. on the pit and quarry codes have demonstrated the fact that a large percentage of the operators have been carrying on with obsolete equipment and in locations where it is economically unsound to operate. Averaging these with the efficient plants results in a cost-of-production figure which is out of proportion to the actual operating expenses of the efficient producer and, in the words of Mr. Chandler, the latter is "penalized." An unduly high market is the natural consequence and from this consequence is bound to follow reduced consumption.

It is this angle that concerns the Consumers' Advisory Board most and its drive to keep weighted cost bases out of new codes, as well as to strike that plan out of existing compacts, is the result.

Financial Support for Codes

An interesting development in the industry during July was the effort made by the ready-mixed-concrete, concrete-masonry, sand-lime-brick, and lime divisions for termination of code provisions which allow exemption of members from supporting the administration of the code in the event that it did not embrace their principal line of business.

Termination of this exemption would force members of the industry to support the code for their particular branch whether or not it covered their principal business, and considerable opposition to such termination is expected from members.

Action by the various code authorities to terminate this exemption provision is seen here as an attempt to force proper support for the code authority and the administration of the codes, difficulty now being experienced in securing financial aid from members, many of which are "hiding" behind the exemption provision now assailed.

The provision, itself, is contained in Administrative Order X-36, dated May 26, 1934, and states: "Every member of the industry or trade is hereby exempted from an obligation to contribute to the expenses of administration of any code or codes other than the code of the trade or industry which embraces his principal line of business . . ."

This provision was made to prevent members of an industry from contributing to the support of more than one code, in the event that their particular business was not confined to one class of business. Criticism concerning the endeavor by the various branches of the industry to terminate this provision were to be made to Deputy Administrator C. L. Hickling of the N. R. A., and inquiry indicates a large amount of such criticism from members of the industry in general.

Handling Complaints

In an endeavor to facilitate the handling of trade-practice complaints for the crushed-stone, sand-and-gravel and slag industries the N. R. A. has approved two Regional Adjustment Agencies authorized to handle complaints of this nature. The first region comprises Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut, while the second region takes in Kentucky, North Carolina and Tennessee.

While the approvals and authorizations of these agencies are subject to revocation at any time by the Administrator, it is expected here that the creation of the trade-practice agencies will greatly accelerate the handling and disposition of complaints regarding trade practices.

Ready-Mixed Concrete

In order to assure the proper financial support of the ready-mixed-concrete code authority, Recovery Administrator Hugh S. Johnson has approved an amendment to the code authorizing the Code Authority to submit a budget and method of assessment upon which funds shall be contributed by members of the industry for the support of code administration. This action definitely removes difficulties heretofore experienced by the Code Authority in securing adequate financial support. Similar action was taken by the Administrator for the sand-lime-brick and shale industries.

Overtime Pay

The Administration is going to look into proposed amendments to the code of fair competition for the clay and shale roofing tile industry on August 1, when it has scheduled hearings here. Of particular moment is the proposal to cut overtime pay in this industry from time and one-half to time and one-third, which is expected to stir up considerable opposition from the Labor Advisory Board as well as from organized labor itself.

The setting up of regional control committees, and alteration of certain trade-practice provisions of the present code, are other features of the proposed amendments. These committees will also be authorized to receive and act on trade-practice complaints. Such committees also have been suggested and finally authorized by the Administration for the rock-crusher manufacturing industry.

Slate-Industry Budget

Following the action of other kindred industries in submitting a budget for approval of the Administrator, together with the basis for contribution to the same by members of the industry for the expense of administering the code, the slate industry has filed such an application with the N. R. A. for consideration. The basis of contribution is to be that percentage of the respective regional quotas which a member's sales in dollars are of the total sales of the industry for each region for the years 1931, 1932 and 1933.

Asks Release of $2,000,000 for Ohio Secondary Roads

Gov. White of Ohio has asked the United States Bureau of Public Roads to release approximately $2,000,000 of the Federal highway grant for 1934 in order to improve additional rural roads of the school-bus-route type and similar county roads. The state has recently added about 400 mi. of county and township roads to the state system and these are being improved with state funds this year. Ohio's total share in the Federal grant is $7,865,012, of which 25 per cent., or nearly $2,000,000, is to be spent on improving secondary roads.

Editorial

The Changing N. R. A.

SINCE the close of the last session of Congress there has been a noticeable lull in the controversies which filled the press concerning the government's activities under the National Industrial Recovery Act. Those who for various reasons attacked the purposes and methods of the N. R. A. felt relieved by the assurance that for a time at least no new legislation would be proposed or enacted, while those who believed it necessary to reply to the criticisms leveled at those activities naturally relaxed under the withdrawal of attacking forces. The result has been a relative quiet in which there is opportunity for calm consideration and appraisal without the distracting influence of a ceaseless clamor of conflicting misrepresentation.

This is having the effect of soothing nerves that have been worn and torn by the stress of the argumentative period and is preparing the way for a more intelligent approach to the problems that still face us and to the means proposed for meeting them. One of the most important truths to which we are gradually becoming accustomed is the necessity, the inevitability, of change, the fact that activity, fluidity, instability are the very essence of life. We are beginning to learn that there is no more reason to expect stability, fixity, finality in the economic phases of our existence than to look for these qualities in any of its other phases. We have learned that change is essential to progress, to development, to betterment in the fields of science and engineering and we boast of our advances in these branches of knowledge. We have observed the operations of nature closely enough to have discovered that the processes of life are continually undergoing change, that rest and inactivity are the very death of life, that the phrase *status quo* denotes a concept and not a reality.

In all these and many other particulars we have seen and become reconciled to the necessity for change. Why have we sought to make exceptions of economics and political science, or why have we failed to observe that these, too, have been characterized by changes equally great and often more revolutionary? Why should be have sought to alter and improve the processes of production, while continuing to insist upon the retention of old methods of distribution? Where was the logic in striving for better ways of selling, while ignoring the need for improving the capacity for buying? Was not it inconsistent to work for new conditions in such fields, and to remain indifferent to the social problems which these created? Did not we seriously deceive ourselves in believing that in an age of mass power production and almost instantaneous communication we could manage our affairs, regulate our lives and improve our lot with the legislative machinery, the political outlook and the standards of value of five generations ago? And have not we been guilty of cheating ourselves mentally and spiritually, have not we indeed postponed the day of our industrial and material recovery, by our attitude of childlike reverence for those "untouchables" of the past?

No wise industrialist worthy of the name expects his plant to last forever or his methods to withstand for all time the rivalry of better processes. He may hope that his capital investment will remain unimpaired throughout his life but experience teaches otherwise and defeats the fulfillment of his wish. He may hope that the last "stroke of genius" has settled his competitive problems, but the very spirit of initiative and self-betterment, on the preservation of which he insists for himself, acts, through the agency of others, to present him with new problems for which new—and, at best, only temporary —solutions must be found. Every intelligent worker in every field of activity knows that every problem which arises and is susceptible to solution is followed by another for which new methods must be devised. No task is ever really completed, no problem ever really solved, since the task and the problem themselves undergo continuous change and must be approached with an attitude of mind that is equally ready to change.

Yet most of us have wished—and, therefore, believed—that this was not true. How comfortable and how easy it was to think that everything had been settled, that "God's in his heaven: All's right with the world." How gayly we planned and carried out our ideas for change—rapid, dazzling and perplexing change — in fields where we had no sacred traditions of established usage; and how sourly we moped, how bitterly we complained, when we were brought face-to-face with the necessity for changes just as revolutionary in our habits of thought on other subjects. It was a shocking discovery to find that, despite our beliefs and contrary to our expectations, nothing escapes the universal process of change, that every minor change is but a phase of greater changes which affect all things.

IN the field of industrial production this fear of change and this belief in our ability to keep "things as they are" have undoubtedly retarded our progress toward business recovery. Aimed first, for example, against the creation of the N.R.A. because of its divergence from all the well-established principles to which we had become accustomed, the criticism that these feelings inspired was directed next against proposed changes in N.R.A. policies. After the shock of the first change had passed it was assumed that another great problem had been settled and that no further alteration was needed. Instead of welcoming the good sense that was capable of discovering the errors in its own creation

and then rectifying them, we adopted the obstructionist policy of blaming it because it could not or did not conceive and execute a flawless plan.

This has been poor judgment on our part and in this summer lull between Congresses we are beginning to realize it. Criticism after the fact, that hindsight that can see mistakes only after they have come to light, is not in as good repute as formerly, when in the clamor of battling protagonists we could not see the issue because of the smoke.

TO us the fact that the N. R. A. is and has been changing is one of the most hopeful signs; hopeful for the country at large, and hopeful, in the narrower sense to its proponents, of the N. R. A.'s ability to survive criticism. The flexibility of the N. R. A., its ability to reverse former decisions, to make different decisions in different cases, to nullify the work and to abandon the policies that seemed important at first, to recognize its own mistakes and to seek to rectify them even at the risk of making fresh errors—these are the qualities that make for success in the field of political science as in that of production and business enterprise. They exhibit not only a capacity for surviving the onslaughts of criticism fair and unfair, but they disclose also a disposition to conciliate, to mediate, to hear and consider, to discover justice if it be discoverable.

The N. R. A. has been trying to revise some of the codes it has already approved and in doing so has sought to withdraw some of the concessions embodied in them, particularly such as relate to open-price policies, which appear in some industries to strengthen existing monopolies or to create new ones; methods of base-cost finding which, when combined with sales-below-cost prohibitions, tend to penalize high-efficiency plants by giving undue weight to the costs of low-efficiency plants; plans for averaging the hours of labor, which have had the effect in some industries of perpetuating, or favoring a return to, pre-code conditions of unsteady and irregular employment; differences in minimum-wage rates for similar types of labor and for sections having similar cost-of-living indexes; and uniform terms of sale, involving credit, contract forms, price determination, and the like. On all these questions each industry now operating under a code of its own may be expected to have different ideas. The existence of nearly five hundred industries which insisted upon maintaining separate identities and obtained individual and different codes is sufficient evidence of these differences in aims and methods. One has to make but a casual examination of the hundreds of codes in effect to realize how strongly various industries, for one reason or another, have separated themselves from their natural allies or competitors, hoping in this way, perhaps, to obtain some competitive advantage in labor control, price-fixing, or trade practices. The industry manufacturing mops, for example, saw more differences than similarities in its problems and, as a result, there are separate codes for the makers of dry mops, the makers of wet mops, and the makers of mop-sticks.

This type of industrial nonsense has resulted from an overnicety on the part of the N. R. A. to grant to individual industries the maximum degree of self-regulation that they considered necessary. That these pleas for separate treatment and special advantages were not always sincere and that the representations offered in support of them were not always true have become increasingly apparent to the members of the N. R. A. staff, as complaints have multiplied and experience has exposed the dangers of carrying self-regulation to its logical ends. The competitive relationships of different industries were not always made clear to—and were sometimes deliberately concealed from—the N. R. A., and inter-industry complaints and the objections of consumer groups have increased greatly because of it. It has been evident for some time that simplification of the existing codes is necessary, not only in the direction of refining each code, but also and chiefly in the combination of different industries under single codes. Alexander Sachs, one time economist of the N. R. A., considered the advisability of devising a single code or a group of uniform or almost identical codes for such natural-resources industries as coal, iron, oil, lumber, aggregates, and the like, while Dudley Cates proposed a more drastic simplification which would require codes only from those industries in which competitive influences result in the exploitation of labor, the social waste of capital, or frauds upon the public "not otherwise punishable by law."

Strong objections to the price-control provisions of many codes—notably those of the iron-and-steel and, more recently, the cement industry—have been raised by the Consumers' Advisory Board, which has been working steadily in an intensive study of the effects of existing codes on the consuming interests. In the early stages of code-making it was not well-equipped or well-informed, and many provisions, which it can not now accept in the light of experience and greater knowledge, were approved. Control over prices has resulted in many industries in unwarranted increases in the costs to the consumer, the government having found in its own purchases a strong tendency to make all bids uniform or only negligibly different. There is a growing feeling that all price-control provisions are unsound and unworkable. Alexander Sachs has said that "for general industry, trade and services these devices will prove to be as administratively impracticable as they are economically subversive."

WE must not become unduly excited about changes in the policies of the N.R.A., as long as these do not overstep the bounds of the law which brought it into being. We must be prepared to see more of them and some even more drastic than those already made. We used to hear much talk, but no evidence, of a "breakdown" of the N. R. A. That is likely to come about the very moment that the N. R. A. becomes the inflexible, adamantine, absolutist bureaucracy which some would like to make it. As long as it retains its present adaptability to new conditions it will survive criticism and abuse and will live to serve industry and the public as fully as its grant of powers will allow.

Plant of the Wabash Sand and Gravel Co., Terre Haute, Ind. Dredge and dewatering station in left background with conveyors handling materials to and from stock-pile.

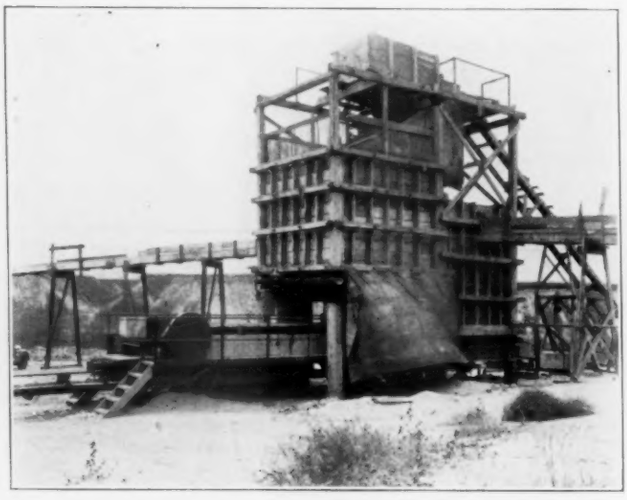
Gravel-Plant Pumping Problem Solved by Use of Field Belt-Conveyor

Stock-piling System Using Reclaiming Tunnel Conveyor Builds Reserve Supply

LIKE many another producer of sand and gravel, the Wabash Sand & Gravel Co. for some time has been faced with the fact that deposits near its plant at Terre Haute, Ind., are rapidly becoming depleted. Dredging operations were being carried on at a distance beyond the economical limit of the equipment in use. Rather than abandon the plant it was decided to install a system of field belt-conveyors to carry the material from a new dredge-discharge point to the plant. This system was put in operation in May, 1934, and has more than doubled the capacity of the plant which was formerly limited by the dredge's capacity. The elimination of excess sand at this point has also contributed considerably to this increase in capacity and has lowered production costs as well.

The deposit and plant are located on a property of 152 acres about 3 mi. north of downtown Terre Haute and only ½ mi. from the city limits. About one-half of the total acreage has not yet been worked. The amount of overburden is negligible and is caved in with the material, which extends about 30 ft. above water level. The proportions of gravel and sand are about equal.

This company has operated at this same location since 1905, when gravel was loaded direct into cars by excavating machines and shovels. In 1910 a small washing plant, to which material was han-



The dewatering station with dredge pipe-line at right. Picking belt-conveyor and field conveyor at left.

The dredge with screen-nozzle ladder elevated. Dewatering station and field conveyor to plant in background.

dled by a drag-line, was installed. In 1915 a larger plant, which used a slackwire drag-line with car haulage to the plant hopper, was built. The present dredge in 1921 replaced this system and the present plant was erected a year later. In May, 1934, the new Robins belt-conveyor system, with which this article is chiefly concerned, was put in operation. The conveying system and its structural-steel framework were supplied by the Robins Conveying Belt Co. and were installed by the company's forces

The field-conveyor bridge across creek and discharge to stock-piling conveyor.

under the supervision of J. E. Johnson, plant engineer.

The dredge is equipped with a 50-ft. Eagle Swintek screen-nozzle ladder and a 12-in. Amsco manganese-steel dredge pump which is driven by a 300-hp. General Electric motor. The dredge is held in position and moved in the usual manner by shore-lines operated by hoists. The pump now discharges through a 300-ft. pipe-line having a lift of 35 ft. to the discharge point. Previously the dredge had pumped a distance of 1,400 ft. with a 55-ft. lift with a resulting loss of capacity.

The dredge pipe-line now discharges to a steel-lined chamber at the dewatering station which is of steel-framed timber construction. The force of the discharge is broken in this chamber and the water and material then flow over two decks of gravity screens having $\frac{5}{8}$ and $\frac{5}{16}$-in. openings. The top deck breaks the force of impact of the material, while the lower deck separates the sand.

The oversize from both decks drops into a 30-cu. yd. bin from which it is discharged through a gate to a 42-in. by 20-ft. flat picking belt-conveyor for the removal of chert, soft stone and the small quantities of lignite present in the deposit. An extra set of rollers was installed to depress the sides of this belt near the discharge end and allows water to drain off to a flume.

The sand passing the bottom screen deck drops in a bin of 60-cu. yd. capacity where the sand is aided in settling by baffles. Any desired amount of sand can be allowed to overflow at this point with the water to a flume leading to a worked-out section of the pit. The settled sand is discharged from the bin on the main field belt-conveyor. This sand forms a cushion to receive the gravel, which is discharged from the picking belt at a point farther along the field conveyor.

This field conveyor, A, is 24 in. wide and 600 ft. long between centers and is mounted on a steel framework supported on concrete footings at a height of a few feet above ground-level. Near the discharge end of conveyor A a steel-truss bridge of 80-ft. span crosses a creek traversing the property. At this point the conveyor is inclined for a short distance to discharge on inclined conveyor B, which discharges on a stock-pile. Conveyor B is 24 in. wide and 158 ft. long between centers and is also supported on a steel framework above concrete footings. The creek channel was dredged under the bridge span after the installation was completed to reroute the creek and to prevent refuse from being carried into the dredging basin.

This conveyor discharges from its end on the stock-pile, which has a total capacity of 4,000 tons. A concrete tunnel below the stock-pile allows the material to be reclaimed through five openings equipped with hand-operated gates feeding a tunnel conveyor, C. The tunnel is 100 ft. long and $6\frac{1}{2}$ ft. high by 7 ft. wide inside, and its floor is at ground-level. A live capacity of 1,400 tons can be reclaimed through this tunnel.

Tunnel conveyor C is 24 in. wide by 333 ft. long between centers and is also supported on steel and concrete. It runs horizontally a few feet above ground-level to a point 44 ft. beyond the end of the tunnel and is then inclined to the top of the plant.

Looking down stock-pile reclaiming conveyor from top of plant. Dredge in background.

All the new conveyors are direct gear-driven by General Electric motors. Conveyors A and B are driven by 15-hp. motors, conveyor C by a 25-hp. motor and the picking conveyor by a 3-hp. motor.

Conveyor C discharges to a 5-ft. by 16-ft. Telsmith revolving scalping screen. The oversize material is chuted to an Allis-Chalmers No. 4 N gyratory crusher, from which it is taken by an elevator to a 3-ft. by 8-ft. Telsmith revolving screen. The oversize from this screen is returned to the same

crusher. The gravel is sized by 6 Stephens-Adamson Gilbert conical screens and the sand by gravity screens and settling tanks. Shipments are made by truck and by railway. The company also owns a locomotive crane for rehandling stock-piled material and two locomotives for switching cars.

Material is produced to meet both Indiana and Illinois specifications.

Vibrating Screen with Spray Nozzles Improves Product

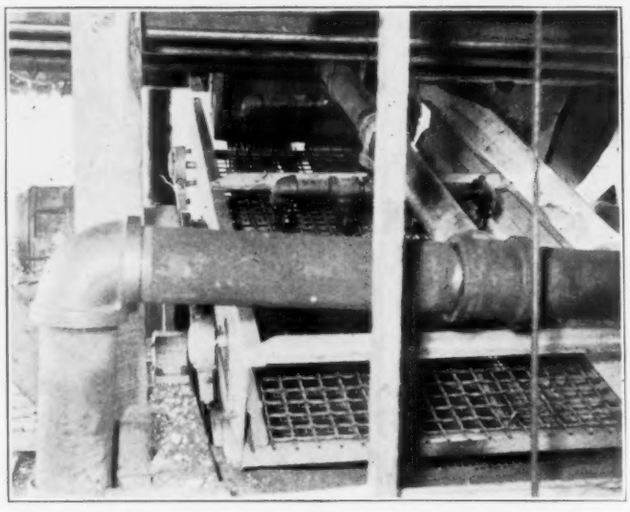
THE sand-and-gravel plant of the Neal Gravel Co. at Attica, Ind., is a good example of the changes which are being made by producers to meet new specifications and conditions. The company's deposit has been worked for over 30 years but the present plant was built in 1919, at which time revolving screens were used exclusively. In 1932 a Greenville soft-stone eliminator was installed. In the spring of 1934 three of four sets of double-jacketed revolving screens were replaced with three vibrating screens which the company had on hand and a new Jigger vibrating screen. These changes have resulted in a cleaner product, better and more flexible sizing and a slight incidental increase in capacity. Excess sand can now be flumed away instead of being rehandled with a 10-in. centrifugal pump as was formerly necessary.

The material in the deposit averages about 50 per cent. below ¼ in. in size. A steam shovel loads it into 50-ton railroad bottom-dump cars which are

Plant of the Neal Gravel Co. at Attica, Ind. Tracks from gravel pit in foreground.

hauled about 3,000 ft. to the plant. Bars spaced 10 in. apart on the tops of the cars keep out bowlders when loading. Gravel is discharged from the cars over a sloping grizzly having bars spaced 2 in. apart. The oversize material goes to two No. 5 Austin gyratory crushers. Traylor bell-heads and concaves were installed on these crushers about a year ago and, according to B. E. Neal, president of the company, have greatly improved their efficiency. The 2½-in. minus product of these crushers drops to a belt-conveyor on the top of the fine material which passed through the grizzly.

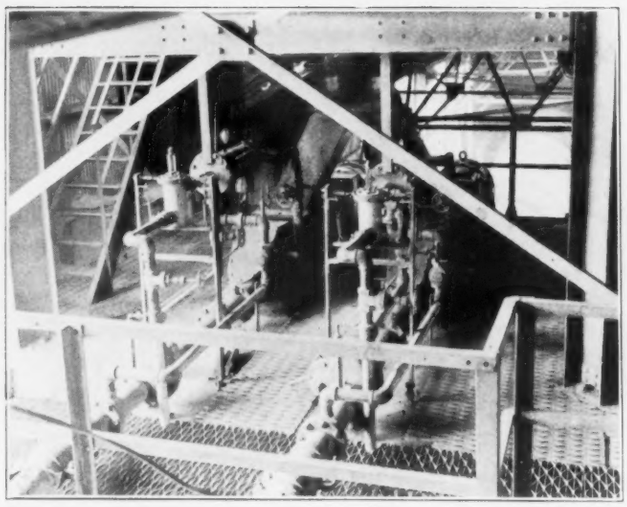
A second belt-conveyor takes the material to the top of the screening building where it is discharged to the Jigger 4-ft. by 8-ft. triple-deck vibrating screen. This has wire cloth with 2-in., ¾-in., and ⅜-in. openings. The material retained on the 2-in. deck goes to a 36-inch Symons disk crusher which reduces it to 1½-in. minus. This material is discharged to the main conveyor and goes back over the



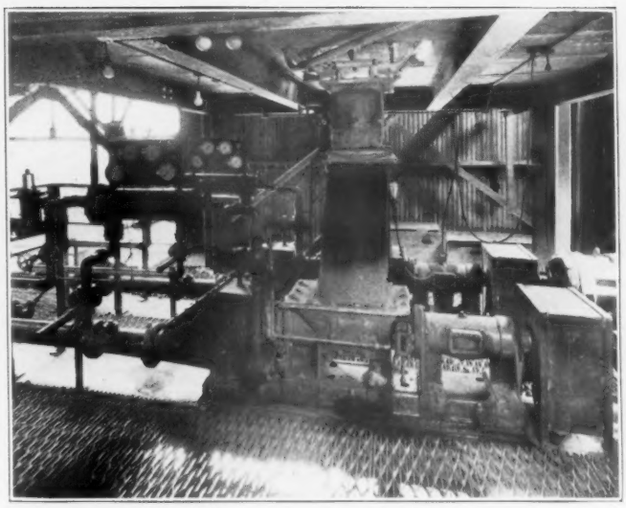
The 4-ft. by 8-ft. triple-deck vibrating screen with spray nozzles and pipe-line.

Jigger screen. The center ¾-in. deck on this screen serves only to protect the cloth on the lower deck and helps to desand the gravel. The material retained on the two lower decks goes to two revolving screens fitted with 1½-in. and 1-in. perforated plate. The fine material passing through the bottom deck of the Jigger screen goes to a 2-deck Simplicity vibrating screen having wire cloth with ¼-in. and ⅛-in. openings. The pea gravel from this screen goes direct to storage and the coarse sand to an overflow box which wastes any desired percentage to a flume. The fine sand goes to a settling-box from which it is discharged to storage.

The minus 1-in. material from the revolving screens is fed to a 3-deck Simplicity screen having ¾-, ½-, and ¼-in. openings. When making state material, all the gravel over ¾ in. in size goes to the Greenville soft-stone eliminator, which discharges to a 2-deck Simplicity screen having ¾-in. and 5/16-in. openings. The oversize material from this screen goes to a picking belt which takes it to storage. Chutes are arranged so that any size can be discharged to any of the three gravel bins. Bottom-discharge gates under the bins are equipped with movable distributing chutes to prevent segregation in loading the cars. An American electric hoist is used for "spotting" the cars. Stephens-Adamson belt-conveyor idlers and pulleys and Goodyear conveyor belting are used. Binks spray nozzles on the vibrating screens insure a clean product.



Roll-feeder and two-way chute to the two low-pressure pumps which feed pulverized raw material to preheater on No. 2 kiln.

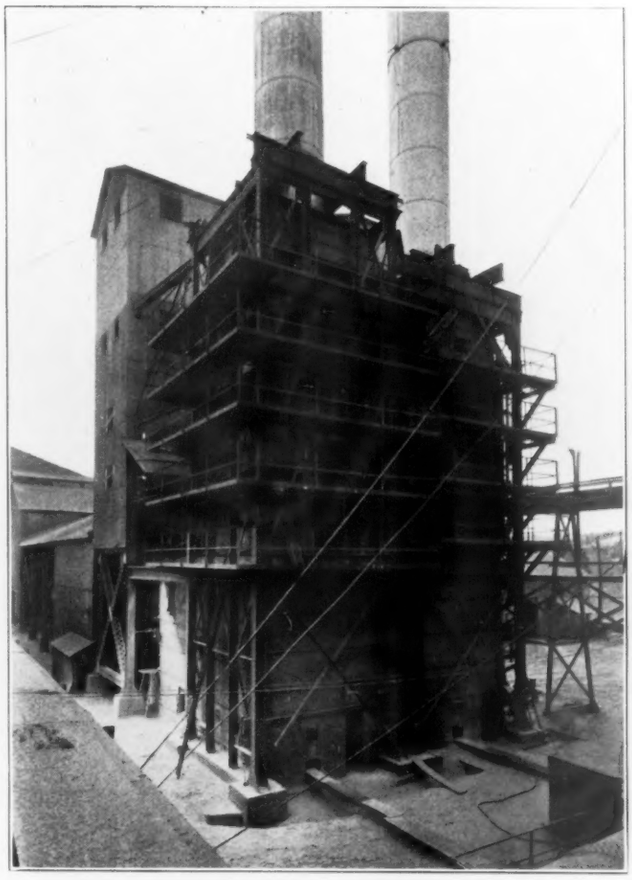


Another view of the two low-pressure pumps with their feed arrangement and instruments. Direct-connected motors at right.

Preheater Cuts Fuel Rate 40 Per Cent. and Lifts Capacity Like Amount

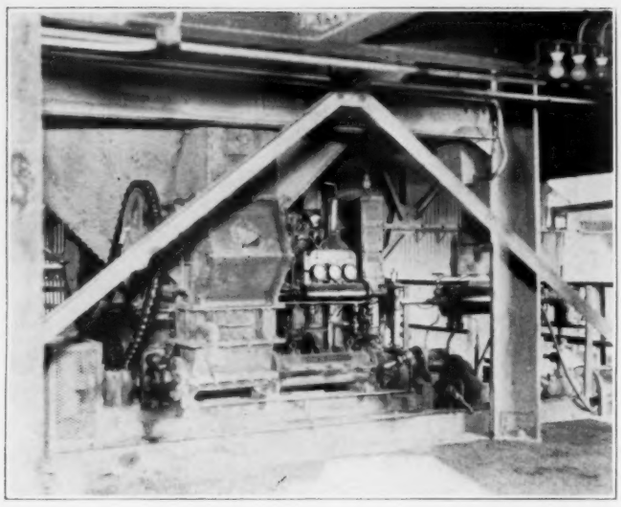
Raises Temperature of Raw Material to Calcining Point Before Feeding to Kiln

THE decreased demand for Portland cement in recent years has transferred the center of interest in production from problems of quantity to those of quality in the product and efficiency in the method of making it. When plants are working full time under the pressure of a heavy and continuous demand for their products, there are few opportunities for experimenting with and adopting new methods. Too often the cost of interruptions to the production schedule may outweigh the expected economies of proposed changes, and in that way the adoption of badly needed improvements may be long deferred. During the last few years, however, experimentation has had its opportunity and the results of research and inventive genius are already apparent.



Preheater installations on No. 2 kiln (left) and No. 1 kiln (right). Building containing feeding and pumping equipment in background.

Conspicuous among the efforts that have brought important results are those of the Coplay Cement Mfg. Co. at Coplay, Pa. Through the collaboration of David J. Uhle, the company's vice-president in charge of operations, and Dr. Max E. Grunewald, its chemical engineer, significant economies in kiln-fuel consumption have been brought about, while, as a sort of by-product advantage, has followed a marked increase in output. The methods used are protected by two United States patents granted to Messrs. Uhle and Grunewald—No. 1,801,467 granted April 21, 1931, on an Apparatus for Heating Cement Raw Material and No. 1,961,311 granted June 5, 1934, on a Method for



Bottom of composition bin with roll-feeders connected to pumps which feed raw material to No. 1 kiln preheater.

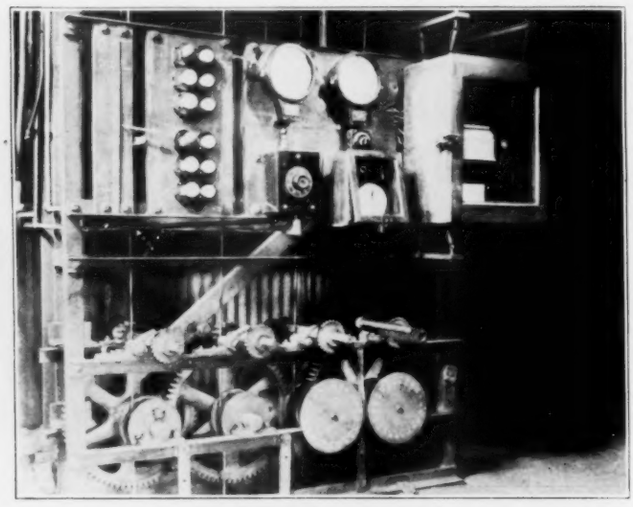
Heating Cement Raw Material. The method, which is known as the Grudex preheating system, is also covered by patents granted by foreign countries.

As a preface to a description of the Grudex method and as a means of distinguishing it from accepted practice it may be worth while to review briefly the reactions which occur within a rotary cement kiln.

The rotary kiln as used in the manufacture of Portland cement in a dry-process plant receives the finely-pulverized and blended raw material at one end and while the material is conveyed through the rotating kiln three distinct processes take place with the raw material. All three are performed by the transfer of heat to the material. The heat is generated by means of pulverized coal, oil or gas flame. The fuel and the combustion gases pass through the kiln in a direction opposite to the flow of the raw material.

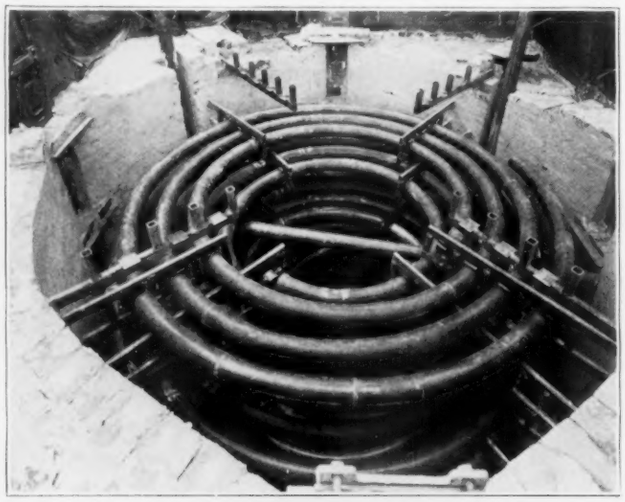
The first process is the heating of the cold raw material to the temperature of calcination, which begins at about 1,500 deg. F.

The second process is the calcination of the calcium and magnesium carbonates, which is practically completed when the material reaches a temperature of 2,000 deg. F.



Control-board on kiln floor with recording and control instruments. Draft-gate controls below.

The third process is the clinkering. The temperature to which the material must be heated in order to become clinker depends on the chemical composition of the raw material and ranges in practical cement-kiln operation from 2,600 deg. F. for raw material low in silica and high in alumina and iron oxide to 2,900 deg. F. for raw material high in silica and low in alumina and iron oxide. The temperatures at which the clinker formation and calcination takes place are such that the heat transfer from the flame and the combustion gases to the material is effected mostly by radiation and for this purpose the rotary kiln is fairly efficient. The temperature



View taken during construction of heat-resisting steel pipes in Kiln No. 2 preheater showing method of support.

toward the back end of the kiln, where the heating of the raw material to the temperature of calcination takes place, is such that the heat transfer is mostly effected by convection and only to a limited extent by radiation.

According to Messrs. Uhle and Grunewald, the rotary kiln is very inefficient for such heat transfer. The kiln walls and the raw material itself expose only a comparatively small surface to the heavy stream of gases, while for efficient heat transfer by convection a large heat-transfer surface is essential. Therefore, the heat losses are said to be large even if very long kilns are used. It was this consideration which started the inventors on the development of the Grudex preheater.

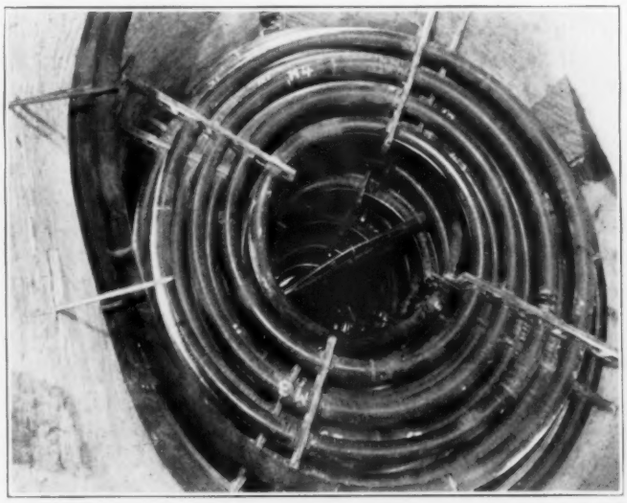
After extensive experiments on a small scale, an experimental preheating unit was installed on a 60-ft. kiln of the Coplay company's plant at Coplay, Pa., in the autumn of 1930. The results obtained with this rather small unit were so encouraging that the company decided to go ahead with the installation of a Grudex preheater on one of its 9-ft. by 125-ft. kilns. The installation was completed and operation started in January of 1932. This kiln, equipped with the Grudex preheater, has been in continuous operation since that time with the exception of

several months when the plant was shut down completely.

The accompanying drawing shows the general arrangement. The preheating unit on Kiln No. 1 consists primarly of two systems of heat-resisting chrome-nickel-steel pipes, all welded, and each approximately 1,000 ft. long, which are located inside a tower built of fire-brick and encased in steel sheeting. The original stack was independently supported at the height to which the brick tower was to rise and the lower section was removed and added to the top of the stack. The stack does not rest on the tower but a sleeve-like arrangement connects the two, allowing the expansion of the brick tower without affecting the stability of the stack.

In this first large installation the pipes are arranged in two straight-line return-bend systems as shown. The gases from the kiln are passed around the straight pipes in a circuitous flow. This aids the heat transfer. The raw material is fed from the original raw-material bin through two Fuller volumetric feeders to the two 5-in. Fuller-Kinyon pumps, each conveying the material into one of the two parallel-pipe systems. Two systems were resorted to because this arrangement allows the use of pipes of smaller diameter.

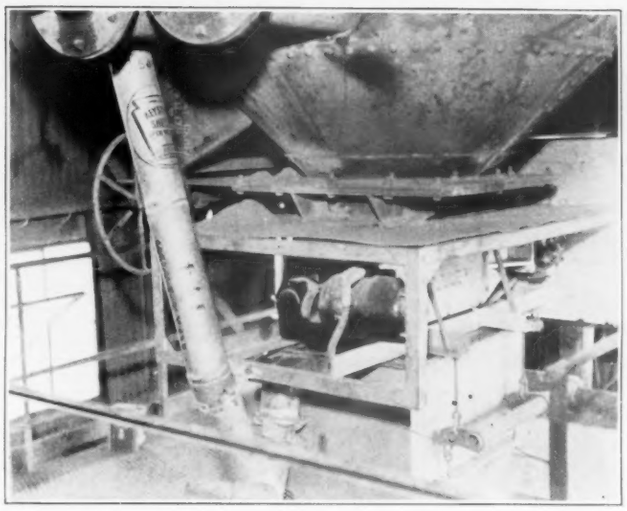
The return-bends are contained in two steel boxes separated from the gas passage by 9-in. fire-brick



Construction view showing heat-resisting steel pipes in Kiln No. 2 preheater looking upward from dust chamber.

walls through which the straight pipes pass and which partly support them. Further support is provided by hangers fastened to the return-bends. The steel boxes are filled with insulating material. This arrangement allows ready access to the return-bends in case replacements should be necessary, but after more than two years of continuous operation the pipes did not show any measurable wear.

The pipes lead from the Fuller-Kinyon pumps to the lower part of the tower, then straight riser-pipes connect to the top row of the pipe systems. After passing through one row after another, from the highest to the lowest, the material travels through pipes along the walls of the dust-settling chamber below into the back end of the kiln. The

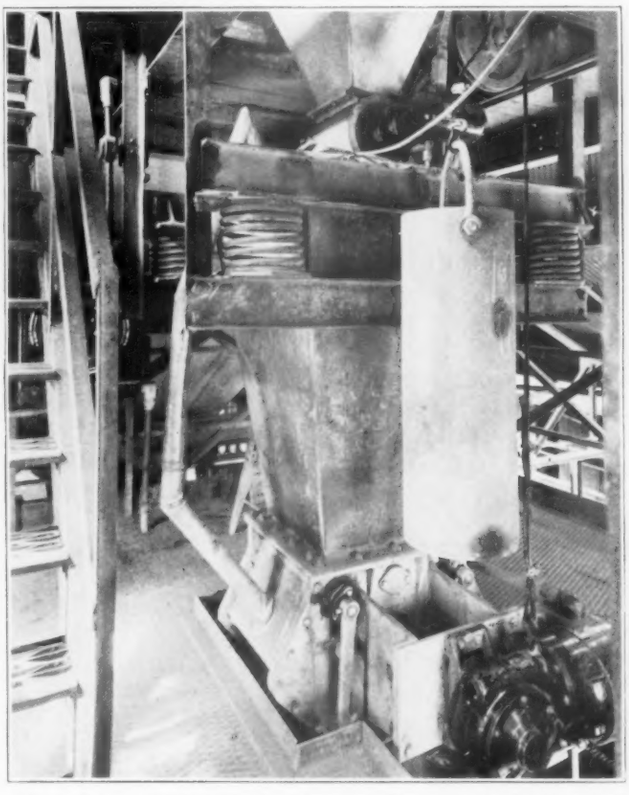


Bottom of Kiln No. 2 composition bin with agitators above. Top of batcher shown with air-release pipe at left.

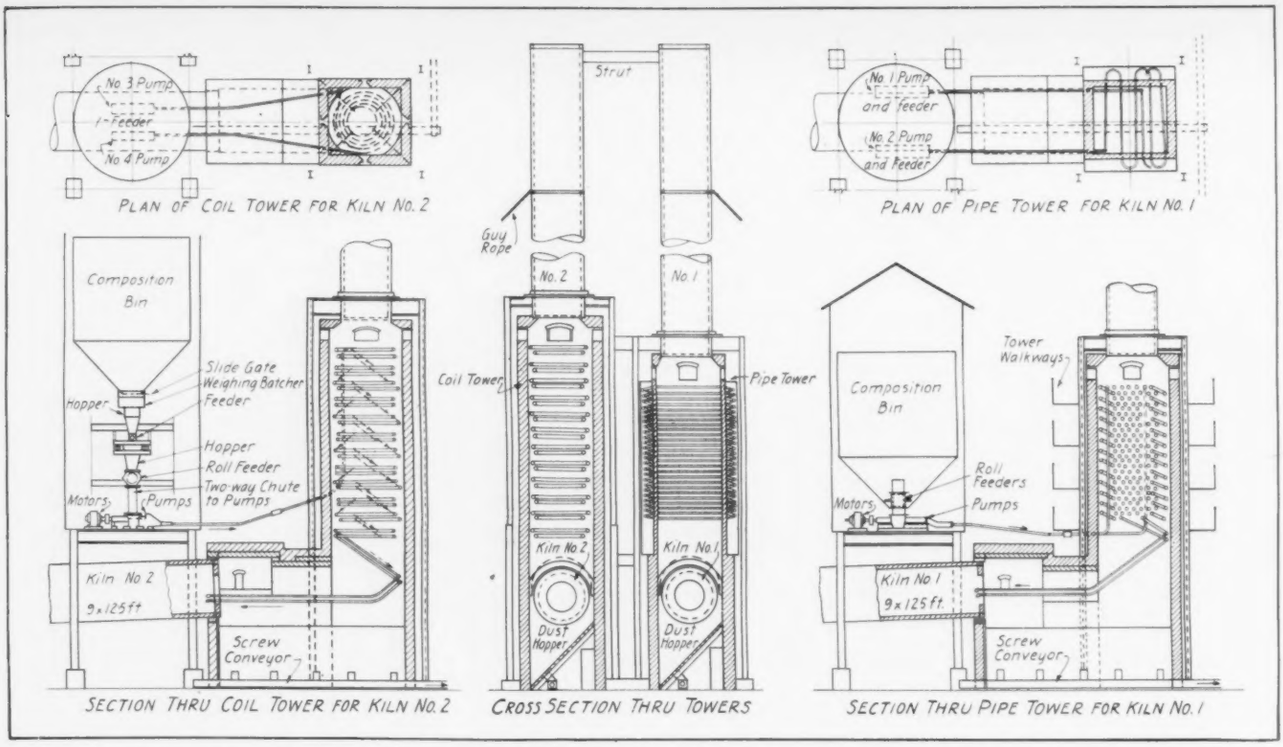
clean-out arrangements in the dust chamber and the door openings in the wall of the tower to allow the removal of the dust from the pipes by blowing with compressed air lances are similar to those used in waste-heat-boiler installations and present no difficulties.

The drawing also shows the general arrangement of the second large preheating installation No. 2 installed on a kiln of the same size next the first one. This installation was completed in May of this year and has been operating since that time.

It differs from the first installation especially in two major points. For the straight-pipe return-bend system's flat coils, supported in the brick wall



The weighing and recording feeder with control-board in left background. Feeder to low-pressure pumps below.



Side, end and plan views of the two preheaters installed in the plant of the Coplay Cement Mfg. Co., Coplay, Pa. Note that the preheater stacks are supported on structural frameworks independent of the preheaters.

by brackets made of the same heat-resisting metal as the pipes, have been substituted. The entire length of the pipe, about 1,200 ft. for each of the two systems, is exposed to the heated gases and utilized for heat transfer. Baffles made of the same heat-resisting metal are provided to prevent the gases from rushing through the open center. The volumetric feeders above the Fuller pumps have been replaced by a Fuller-Grunewald weighing and recording feeder which was described in the July, 1934 issue of PIT AND QUARRY, page 55.

To keep the kiln operator informed regarding the temperatures prevailing at the back end of the kilns and inside the towers a recording pyrometer is provided on the operator's platform. Recording draft-gages and draft-controls, consisting of doors near the top of the towers which can be opened and closed by remote control, are provided. The quantity of kiln feed is regulated by remote control from the kiln operator's platform.

According to Messrs. Uhle and Grunewald, the coal consumption per barrel has been reduced about 35 per cent. in the case of the first installation and more than 40 per cent. in the case of the second installation. At the same time the output of the kilns has been increased 35 per cent. and more than 40 per cent. respectively.

The power consumed by the pumps is about 1 kw.-hr. per bbl. in the first installation and less than half that amount in the second. The quantity of compressed air fed to the Fuller pumps is small since the expansion of the entrained air in the heated zone assists in propelling the material through the pipes and into the kiln. From 70 to 90 cu. ft. of free air per min. is used for each pump.

The material is discharged into the kiln in the No. 1 installation at 1,100 to 1,200 deg. F., but, on account of the greater heat-transfer surface of the pipes the discharge temperature of the material is 1,300 deg. to 1,400 deg. F. in the second installation.

The gas temperature of the kiln exit is 1,700 deg., and on the top of the tower before entering the stack about 1,100 deg., creating sufficient natural draft for the kiln.

Due largely to the absence of moving parts exposed to the heat, the cost of maintenance of these installations is very low. Examination of the heat-resisting pipes in the first installation after more than two years continuous operation shows, as has been said, no measurable wear. The repair and maintenance expense of the pumps and feeders, the only moving parts of the installation, have been no more than would be expected of any kiln feeders and pumps handling raw material.

No extra labor is required since the regular box tender can readily take care of the feeders and pumps for the two kilns which need very little attention.

The clinker produced with the two kilns is said to be of a very high quality. The intimate mixing of the small particles of raw material while they pass through the preheating pipes is said to make a more uniform clinker than would be normally obtained and has made it possible to reduce the raw-material fineness on the 200-mesh sieve by 2 per cent., effecting a considerable saving in grinding cost.

It should also be noted that the gases do not come into direct contact with the raw material after they leave the kiln. Volatilized alkali, therefore, can not be redeposited on the raw material, a condition which would tend to cause irregularities in the setting properties of the cement. *(Continued on page 40)*

Gravel Firm Adds Scrubbing Equipment to Meet Changing Standards

Excellence of Original Plant Design Makes Costly Rebuilding Unnecessary

By W. E. TRAUFFER

NOT many plants built four years ago were so well designed that they can meet the exacting demands of present conditions without the making of important changes. This ability to produce material efficiently and economically in a period when the traditional methods of cost cutting through lengthening hours and reducing wages are frowned upon is perhaps the point of chief interest in the plant of the Cooley Gravel Co. near Chillicothe, Mo. Except for the installation of modern scrubbing equipment to enable the plant to produce material that will meet present-day standards of cleanliness, no important changes have been made since it was erected in 1930. The general design of this plant and the manner in which various problems have been solved justify a lengthy description.

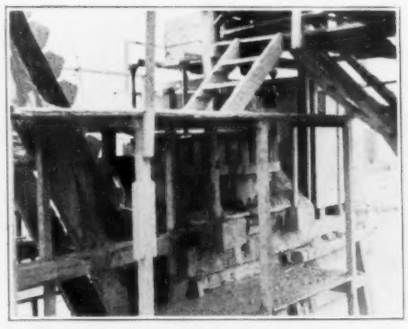
The plant and deposit are located about 7 mi. west of Chillicothe and 2 mi. east of Sampsel, Mo. A side-track connects directly with the Wabash Ry. and through the latter with the C. B. & Q. Ry. at Chillicothe and the C. R. I. & P. Ry. at Lock Springs, Mo.

The gravel deposit is of glacial origin and is said to be a terminal moraine. The surface of the deposit averages about 35 ft. above water-level and has an average of about 18 ft. of overburden above it. Below water-level the deposit runs high in sand but above it consists of about 50 per cent. gravel of which about half will pass through a 1-in. opening. The deposit contains considerable silt, amounting to from 10 to 15 per cent. of the total material. Some of this silt is clay but most of it is extremely fine sand. Many clay balls are found in some sections of the deposit.

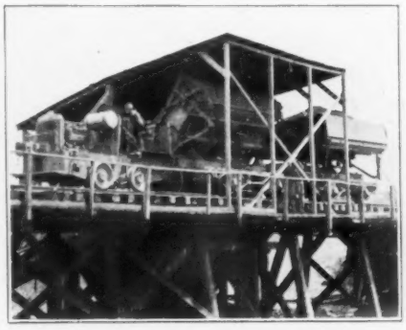
According to reports this deposit was first worked in 1904 by the Wabash Ry. for ballast. The first gravel plant was built in 1926 and was taken over by the present company in 1929. In 1930 this was torn down and the present plant built, using very little of the old plant or equipment. The new plant was designed by C. G. Cooley, president and general manager of the company. Unusually difficult production problems were encountered in working out the proper machinery and methods to be used. The only important change made since the plant was built was the installation of a Hardinge conical scrubber. The plant is of timber construction and has a capacity of 200 tons of gravel and 50 tons of sand per hr.

A Monighan drag-line, mounted on rollers and handling a 3½-cu.-yd. Page drag-line bucket, is used for stripping as well as for loading material for the plant. It is powered by a Fairbanks-Morse 3-cyl., 150-hp., Type Y semi-Diesel engine and has a 125-ft. boom. The stripping is done during the winter and enough overburden removed for the following year's operations. The overburden is overcast into the worked-out pit left from the preceding season's operations. Gravel is loaded into a train of two 10-cu.-yd. Western all-steel air-operated side-dump cars which are drawn by a Whitcomb 8-ton gasoline locomotive. A Gardner-Denver 4½-in. by 4-in. Duplex air-compressor mounted on the locomotive supplies air for dumping the cars.

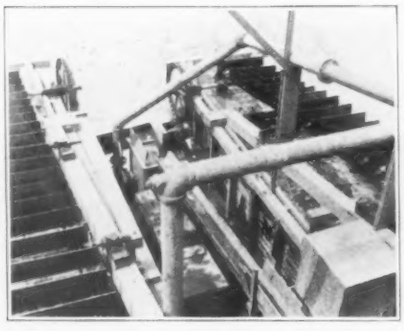
The gravel is at present being hauled a distance of about 1,200 ft. to the plant, where the cars discharge their contents from above a timber trestle into a 35-cu.-yd. track-hopper. In spite of the length of the haul and the fact that only one train is used, the size of the feed hopper insures a steady supply of material to the plant. A rail grizzly with 10-in. openings over the hopper holds out any stones too large for the crusher. These are sledged to a size that will pass through the grizzly. A Telsmith 30-in. reciprocating feeder under the hopper discharges on a Link-Belt 3-ft. by 6-ft. single-deck



The 4-ft. cone secondary crusher which discharges to elevator at left.

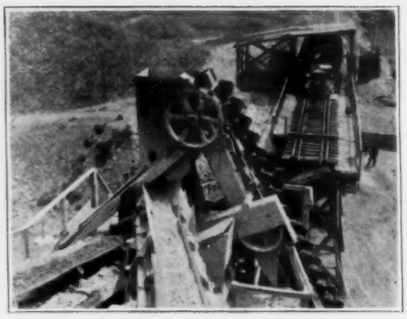


Locomotive with cars on trestle discharging into primary crusher.



The two sand-drags with water booster pump in center.

Improvised dredge creating pond for added water supply.



Elevator from secondary crusher and feeding belt-conveyor to vibrating screen.

Shaker screen, primary crusher and main belt under track hopper.

shaker screen. This has a steel-plate with 4½-in. by 9-in. openings which not only screens but prevents any of the material going back with the return motion of the screen.

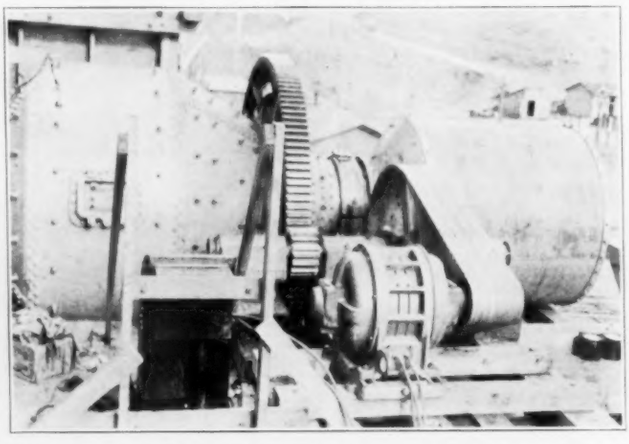
The oversize from the shaker screen goes to the Acme No. 9½ DD primary jaw crusher whose product, preceded by the throughs from the shaker, is discharged on a 26-in. belt-conveyor running to the top of the screening plant. To protect this belt a steel-plate partition under the shaker screen allows the finest of the throughs to fall on the conveyor first to form a cushion. The conveyor discharges to a 60-in. by 22-ft. Telsmith revolving screen having ¾-, 1-, 1½- and 2-in. round openings on the main barrel and a jacket with 5 ft. of ⅛-in. round and 8 ft. of 1-in. square openings. A 4-ft. scrubber section with baffles at the feed end of the screen gives the material a preliminary scrubbing with the aid of water introduced through a spray pipe.

Intermediate sizes produced are chuted direct to storage-bins. The oversize, usually plus 1-in., is fed to a 26-in. horizontal belt-conveyor which feeds the Symons 4-ft. cone crusher. This is set at 1-in. opening. Its product goes to a 20-in. Link-Belt bucket-elevator which discharges on a 19-in. inclined belt-conveyor that feeds a 3-ft. by 8-ft. Link-Belt double-deck vibrating screen. This ordinarily has cloth with ⅞-in. and 10-mesh openings on its top and bottom decks, respectively. The oversize ordinarily goes to the belt-conveyor feeding the Symons crusher, the intermediate size to storage, and the fines to the waste flume. When producing concrete aggregate, however, cloth with 1⅛-in. openings is used on the top deck and the intermediate size goes to the Hardinge scrubber.

The sand coming from the revolving scalping screen is flumed to a Link-Belt 36-in. by 30-ft. drag-tank whose product goes by a chute to the Hardinge 8-ft. diameter by 48-in. by 8-ft. conical scrubber. The scrubber product is sent by a 6-in. Hetherington & Berner sand pump to a second drag-tank of the same make and size as the first. The product of this tank is chuted to storage. With this arrangement only one grade of sand, usually concrete sand, can be made at one time. When making masons' sand, a jacket with 8-mesh openings is added to the trommel on the scrubber. The trommel has ⅜-in. openings and is used for rerinsing purposes only when concrete aggregate is being produced. Four Binks nozzles in the trommel furnish rinsing sprays. The washed stone in this case can be chuted either to storage or direct into cars for shipments.

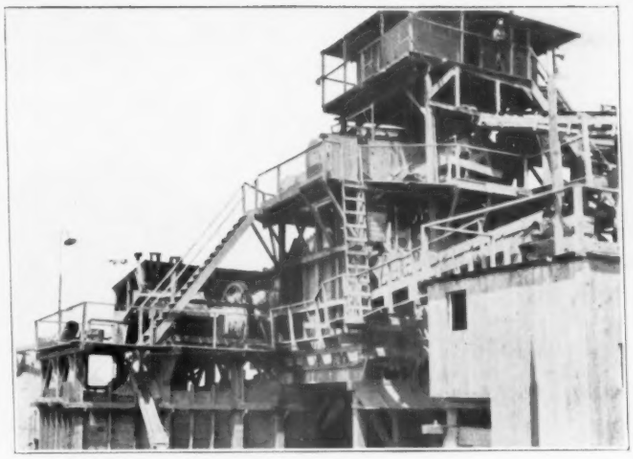
Two distinct bin structures are used for storing the various materials produced. The bin under the revolving screen has two compartments, each of 55-cu.yd. live capacity, which can discharge material either into cars on a track below the bin through sliding gates or through side-discharge gates into cars on another track alongside the bins. The bin under the Hardinge scrubber has three compartments, each one of 16-cu.yd. capacity, which are used to store ballast, pea gravel and sand. A 24-in.

Drag-line loading sand and gravel into cars hauled by gasoline locomotive.



The conical scrubber with attached trommel for rinsing, motor, and V-belt drive.

View of plant with cars waiting to be loaded. Note tower from which all operations are controlled.



Another plant view showing two separate bins, scrubber and control-tower above revolving screen.

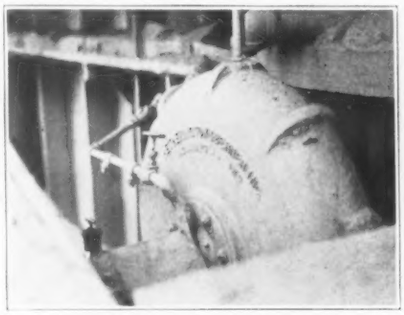
horizontal belt-conveyor set on 90-ft. centers under these bins is to be extended an additional 86 ft. on an incline to the top of an 80-cu.yd. timber bin which is now under construction. This bin will be used for both car and truck loading.

Cars are handled on the company's track by a 10-ton Holt gasoline crawler tractor by means of a cable. They are "spotted" under the bins by a Link-Belt Caldwell No. 2 electric car-puller. A large supply of stock-piled material is kept on hand and this is rehandled to and from storage by a Link-Belt steam locomotive crane and a P & H gasoline crawler crane. The former has a 1-cu.yd. Owen clam-shell bucket and the latter a ¾-cu.yd. Hayward bucket.

The bulk of the gravel produced by this plant is used for road-surfacing. At times considerable ballast is sold. There is also some demand for concrete gravel and for sand. Neither of these last two products passed the state specifications before the present scrubbing and washing system was installed. The plant also produces oil-mat gravel, and plaster, masons' and engine sands. The largest material used by the state is 1 in. in size and for certain types of state work a high percentage of silt is specified. There is also a considerable market for sand. Due to the well-balanced demand and the flexibility of the plant there has been very little material wasted in the five years during which this plant has operated. Most of this waste has been excess silt and clay.

Because of the excellent results obtained through the installation of the Hardinge scrubber a more detailed description of the company's experience with it is perhaps justified. The sand formerly produced was unsuited for concrete work due to the large quantity of clay, ocher, silt, etc., in it. To make matters worse, the sand was coated with a film of some foreign material, perhaps a combination of the above, which gave it a muddy color. Now the sand produced is much lighter in color, is practically free from vegetable matter and easily meets all specifications. The same is true of the concrete gravel, the scrubber eliminating the sandstone which was formerly mixed with this material. There is still some variation in the product due to variations in the deposit but, according to the state inspector at the plant, none of the material now being shipped comes near the 5-per cent. limit set by the state whereas it formerly contained about 10 per cent. of objectionable matter. The average is now about 2½ per cent. although some of the material shows less than 1 per cent.

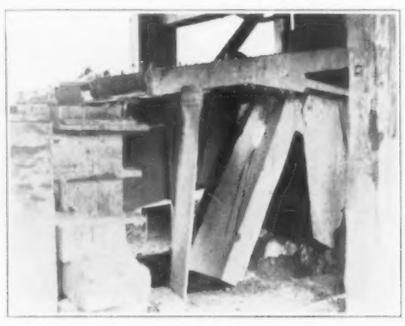
When the scrubber was first installed grinding balls were used, but it was found that better results were obtained by letting the material scour itself. This was true in the case of both sand and gravel. It was also found that a speed of 22 r.p.m. gave the best results as the material was then carried up the side and given the same cascading action which is so successful in the operation of ball and tube grinding mills. This scrubber always has about 7 cu.yd. of material in it when running and this insures a good scrubbing of all the particles.



Centrifugal pump which rehandles sand from scrubber to drag-tank.

Partly because of the im-

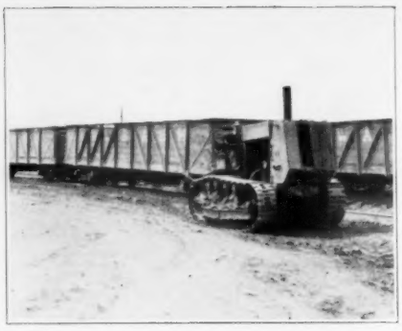
The double-deck vibrating screen used for the production of special sizes.



Crusher and shaker screen with partition allowing fines to form cushion on belt.

Portable gasoline-driven electric welder. Bucket being rebuilt in background.

Workman rebuilding 3½-cu.yd. dragline bucket with arc welder.

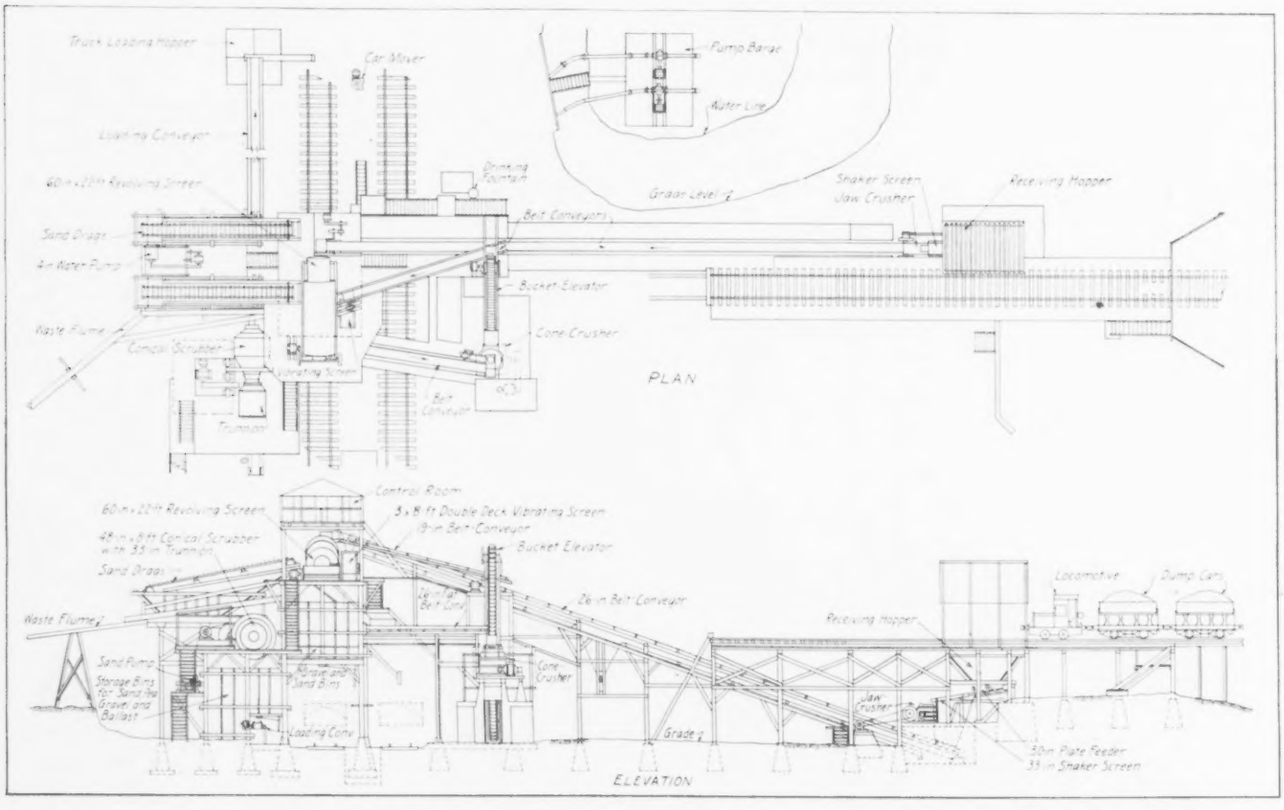


A 10-ton gasoline crawler tractor switching loaded and empty cars.

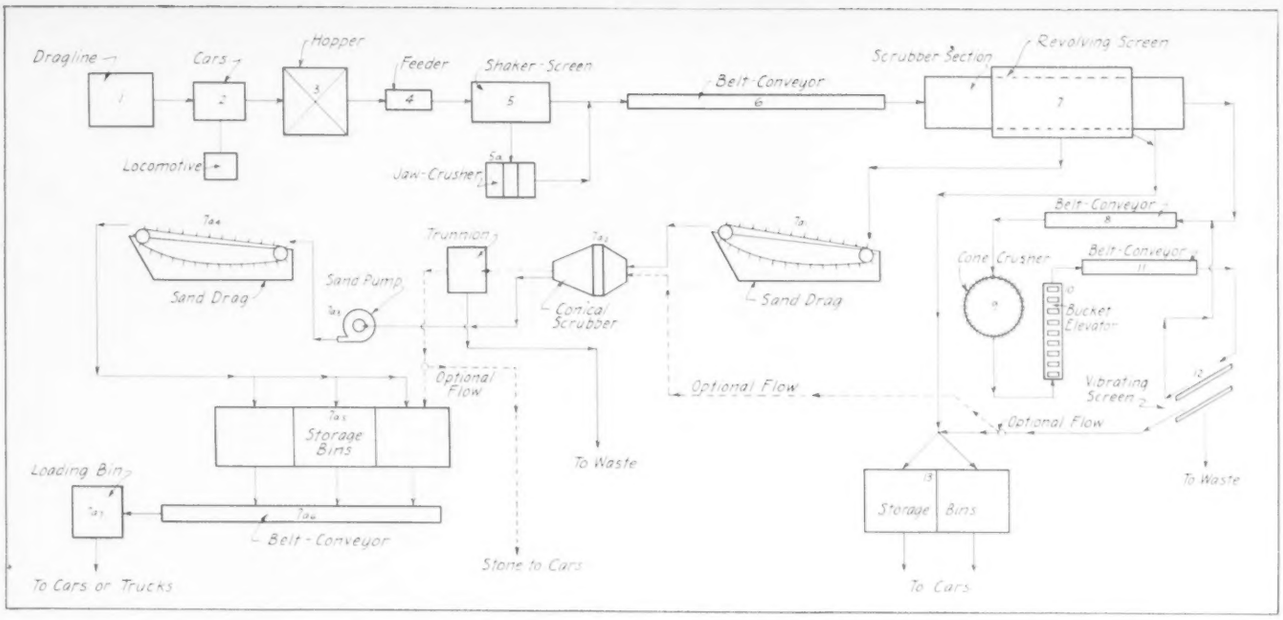
proved quality of its product this plant did the best year's business in its history in 1933 as it was able to supply any desired type of material.

One of the outstanding features of this plant is the manner in which operations are controlled. The method in use not only makes the plant safe for the workmen but it also insures against damage to equipment or expensive choke-ups in case of a breakdown in any part of the operation. One man, stationed in a control house at the extreme top of the plant, is in complete control of the entire operation. From this house, which is surrounded by a railed platform, he can see each piece of important equipment in the plant. Further to insure safety no workmen except the few required to operate the plant are permitted to be in the plant except with the knowledge of the operator.

Grouped back to back in the control house are switches for all the plant equipment. These are arranged so that, by making one round, the operator can start or stop all the machinery in the correct sequence. From his position at each of these switches he can see the unit of equipment which it controls. In addition to the switches a push-button on the platform enables the operator to stop instantly the belt feeding the reduction crusher. Another button sounds a signal to the operator at the primary crusher in case it is desired to stop the feed to the plant. Another switch enables the operator to stop the water pumps. These can be started only by a local switch, because they are often required to furnish water for purposes other than washing when the plant is not in operation. Also at this control board are the main plant switch, the various light switches, a power-factor indicator, a.-c. and d.-c. indicators for the synchronous motors driving the reduction crusher and the conical scrubber, etc. The plant is well fitted with lights and flood lights for



Plan and elevation drawings of the plant of the Cooley Gravel Co. near Chillicothe, Mo., which illustrate its simple and compact yet flexible design.



Flow-sheet of sand-and-gravel plant of the Cooley Gravel Co., near Chillicothe, Mo.

TABULAR ANALYSIS OF THE OPERATIONS AND EQUIPMENT OF THE COOLEY GRAVEL CO., CHILLICOTHE, MO.
(Key numbers refer to corresponding numbers on accompanying flow-sheet.)

Operation	Key	Equipment	Make	Model No., Size, Capacity or Type	Power Source	Power Transmission
Stripping and loading	1	Drag-line	Monighan	Roller mounted with 3½-cu. yd. Page bucket	Fairbanks-Morse 3-cyl., Type Y, 150 hp. semi-Diesel engine	
Haulage	2	Locomotive	Whitcomb	Gasoline, 8-ton, 56½-in. gauge		
		Cars	Western	10-cu. yd. steel, air-operated side-dump		
Scalping	3	Grizzly		Rail, 10-in. openings		
	3	Hopper		35-cu. yd.		
	4	Feeder	Telsmith	Reciprocating, 30-in.	Crusher drive-shaft	Flat belt
	5	Screen	Link-Belt	Shaker-type, 3-ft. by 6-ft.		
Primary crushing	5a	Crusher (To 6)	Acme	Jaw, size 9½ DD, 10-in. by 20-in.	General Electric 40-hp. induction motor	Flat belt
First screening	6	(From 5 and 5a) Conveyor	Link-Belt	26-in., 145-ft. centers	General Electric motor	Link-Belt silent chain and gear
	7	Screen (To $7a_1$, 8 and 13)	Telsmith	Rotary, 60-in. by 22-ft.	General Electric 15-hp. induction motor	Link-Belt silent chain and gear
Secondary crushing	8	(From 7 and 12) Conveyor	Link-Belt	19-in., 36-ft. centers	Westinghouse 3-hp. induction motor	Link-Belt silent chain and gear
	9	Crusher	Symons	Cone, 4-ft.	General Electric 100-hp. synchronous motor	Allis-Chalmers Texrope
Final screening	10	Elevator	Link-Belt	Belt-bucket, 20-in., 44-ft. centers	General Electric 10-hp. induction motor	Allis-Chalmers Texrope and gear
	11	Conveyor	Link-Belt	26-in., 26-ft. centers	General Electric 5-hp. induction motor	Roller chain and gear
	12	Screen (To $7a_2$, 8 or 13)	Link-Belt	Vibrating, 3-ft. by 8-ft. double deck	Westinghouse 3-hp. induction motor	Allis-Chalmers Texrope
Scrubbing	$7a_1$	(From 7) Drag-tank (From $7a_1$ and 12)	Link-Belt	36-in., 30-ft. centers	General Electric 25-hp. induction motor	Link-Belt silent chain
	$7a_2$	Scrubber (If stone to trommel, if sand to $7a_3$)	Hardinge	Conical, 48-in. by 8-ft. with 33-in. trunnion	General Electric 100-hp. synchronous motor	Allis-Chalmers Texrope
		Trommel (To $7a_3$ or cars)				
Sand washing	$7a_3$	(From $7a_2$) Pump	Hetherington & Berner	Centrifugal, 6-in. sand	General Electric 20-hp. induction motor	Allis-Chalmers Texrope
	$7a_4$	Drag tank	Link-Belt	30-ft. centers, 36-in.	Same as first drag $7a_1$	Link-Belt silent chain
Sand and concrete-gravel storage and loading	$7a_5$	(From $7a_4$ and $7a_2$) Bins (3)		16-cu. yd. live capacity each		
	$7a_6$	Conveyor	Link-Belt	Belt, 24-in., 150-ft. centers	General Electric 10-hp. induction motor	
	$7a_7$	Bin (To cars or trucks)		80-cu. yd. capacity		
Gravel storage	13	(From 7 and 12) Bin (2) (To cars)		55-cu. yd. live capacity each		
Water supply		Pump	Dean Hill	4-in. centrifugal high-pressure	General Electric 20-hp. induction motor	Direct-connected
		Pump	Aurora	6-in. low-pressure	General Electric 25-hp. induction motor	Direct-connected
		Pump, booster	Montgomery Ward	4-in. centrifugal		Flat belt
Miscellaneous		Car mover	Caldwell		General Electric 12-hp. induction motor	

A group of the employees of the Cooley Gravel Co., most of whom have been with the company since the plant first began operation.

night operation. Practically all the electrical equipment and all the motors, with one exception, were furnished by the General Electric Co.

One of the chief problems at this plant has always been the water-supply. Originally the plant depended on ground water from the worked-out part of the gravel pit for its wash-water. With the installation of the present washing and scrubbing system and its requirements of about 1,500 gal. per min., however, this supply proved inadequate, especially during dry seasons. To increase this supply the water from the waste pile was drained into a ditch dug for that purpose. A control gate at the end of this ditch allows the water to flow through a pipe under the tracks to the pond, from which it is taken by a Dean Hill 4-in. high-pressure pump and an Aurora 6-in. low-pressure pump mounted on a barge made of oil drums.

As the water-supply was not yet adequate it was decided to provide additional capacity by digging a new water hole in another abandoned section of the pit. The digging of this hole, which is now well under way, is being done with a hydraulic dredge which was designed and assembled at the plant. It consists of a 4-in. Kansas City Hay Press centrifugal sand pump, driven by a 20-hp. Continental gasoline engine, both mounted on a plank floor supported by oil barrels. The intake nozzle is operated by a hand hoist. The sand is discharged at some distance from the pond and is recovered by a small drag-scraper operated by a gasoline-engine-driven hoist.

A complete machine and blacksmith shop, where practically all repairs can be made, is maintained at the plant. In addition to the usual equipment such as forges, drills, oxy-acetylene cutting and welding sets, etc., the company has a General Electric portable electric-welding outfit which is driven by a Buda 4-cyl. gasoline engine. At the time the plant was visited this set was being used to rebuild a 3½-cu.yd. drag-line bucket, using Stoody and Stoodite metal.

An illustration of the advantages of having complete repair equipment and competent repairmen at a plant was furnished by an incident which occurred a few days before the author's visit to the plant early in May. A pin came out of the brake mechanism, causing the engineer to lose control of his locomotive and it ran off the end of the trestle and fell to the ground 19 ft. below. The engineer jumped out on the trestle before the locomotive fell and was uninjured. The two loaded cars which the locomotive was pulling fell on it, wrecking the locomotive's cab and radiator and fracturing its front frame cross-member, the front motor support and the engine flywheel housing. With the exception of a few minor parts which were purchased, all these repairs were made at the plant. The accident occurred on a Friday and the locomotive was back in service Monday morning.

As has previously been stated, the plant was designed by Mr. Cooley and incorporates many original ideas conceived during his twelve years' experience as a sand-and-gravel producer. He started operating a small temporary plant in Indiana in 1922 shortly after his graduation from Purdue University in 1921 with a degree of mechanical engineering. In 1925 he built a plant at Gosport, Ind., which he still operates. The Sampsel plant, however, is the larger and more important of the two and Mr. Cooley now spends most of his time there, maintaining an office in Chillicothe. C. W. Wiles is plant superintendent at Chillicothe. The company is an Indiana corporation and is owned jointly by Mr. Cooley and W. P. Chapin and W. R. Shiel of Indianapolis.

The plant is entirely of heavy timber construction with concrete footings and foundations. Most of the equipment, including belt-conveyors and pulleys, bucket-elevators, silent-chain drives, shaker and vibrating screens, sand-drags, etc., was furnished by the Link-Belt Co., and the bin gates, feeder and revolving screen by the Smith Engineering Co. Cincinnati Rubber Co. conveyor belting and Roebling cable are used exclusively. Morrow metal screen plate is used on the shaker screen and Ludlow-Saylor wire screen cloth on the vibrating screen and on the revolving screen and scrubber sand jackets.

Potash Production in 1933

Potash produced in the United States in 1933 amounted to 333,110 short tons of potassium salts equivalent to 143,378 short tons of potash, an increase of 133 per cent. in gross weight and of 131 per cent. in K_2O content over 1932 (143,120 tons gross weight, and 61,990 tons K_2O).

Preheater (from page 34)

Summarized, the advantages claimed for the Grudex preheating system are: (1) that it can be readily installed on existing kilns; (2) due to its simplicity, the first cost, maintenance expense and power consumption are very low; (3) no extra labor is required for the operation; (4) substantial fuel savings are obtained; (5) the capacity is increased; (6) an excellent quality of clinker is being produced; and (7) savings in the raw-material-grinding costs have been effected.

MEN OF THE INDUSTRY

C. G. COOLEY

C. G. COOLEY, president and general manager of the Cooley Gravel Co. of Chillicothe, Mo., and Gosport, Ind., was born in Indiana in 1897. During the World War he served as a naval officer after attending the U. S. Naval Academy. He graduated at Purdue University in 1921, and after several other ventures started in the sand-and-gravel business. He was interested in three temporary plants in Indiana and in 1925 constructed a permanent plant at Gosport. In 1929 his company purchased the plant at Chillicothe and in 1931 he became interested in a plant near Alexandria, La., which was operated for two years and then sold. Mr. Cooley is in active charge of the prospecting and testing of deposits and the design, construction, operation and sales of his plants. He is also a member of the Missouri State Committee.

Personal Mention

Alphonse F. Brosky has been appointed by the Jeffrey Mfg. Co. as special engineer attached to its general offices at Columbus, O. To accept this new post Mr. Brosky has resigned as consulting editor of Coal Age, on whose staff he had served in various editorial capacities since 1921, until the past winter when he acted as Assistant Fuel Advisor to the Federal Surplus Relief Corp in Washington.

Neal Ross, former Missouri state blue sky commissioner, recently resigned to take a position with the Ready-Mixed Concrete Co., Kansas City, Mo.

L. T. Sunderland, president of the Ash Grove Lime & Portland Cement Co., Kansas City, Mo., has been named by the R. F. C. as one of a committee of five outstanding Kansas City business executives to assist business and industry in the Kansas City trade territory to take full advantage of the various federal loan agencies now in operation.

Herman H. Wagner, secretary and treasurer of the Union Quarries Corp., Hummelstown, Pa., was recently elected executive secretary of the Crushed Stone, Sand and Gravel and Slag Industries, District 5, Region 3. He is also a member of the Regional Code Committee for the state.

W. W. Fischer, president of the Fischer Lime & Cement Co., Memphis, Tenn., was recently appointed to the chairmanship of a national committee which will cooperate in a national building program sponsored by the National Association of Builders' Supply Associations and the builders' supplies national code authority. He was also elected chairman of the manufacturers committee at the recent semi-annual session of the association in Memphis.

R. F. Weston recently joined the cement division of the Babcock & Wilcox Co., New York City. Mr. Weston has had a long experience in the cement industry, having formerly been general superintendent of the Valley Forge Cement Co. and the Allentown Portland Cement Co.

W. A. Watson has joined the Stowe-Fuller Refractories Co., Cleveland, O., as vice president. Prior to this new connection he was for 10 years associated with the General Refractories Co. as district manager of their Detroit territory.

Joe Wilson, a chemist for the Monarch Cement Co., Humboldt, Kans., was seriously injured July 11 by an explosion of chemicals in the company's laboratory.

Springer N. Dale, superintendent for the Bedford-Nugent Co., Evansville, Ind., has applied for patent rights on a gravel-cleaning machine.

W. Cornwell, formerly manager of the crusher department for the Austin-Western Road Machinery Co., Chicago, Ill., has been appointed manager of a new branch established by the company in Los Angeles, Cal. The south West Coast territory of the company has been divided into two parts, southern California and Arizona being segregated from the northern part of California.

Henry S. Gray, secretary and treasurer of the Louisville Cement Co., Louisville, Ky., was recently appointed to the Industrial Advisory Committee of the Eighth Federal Reserve District.

Obituary

Henry Bode, president of the Bode Gravel Co., San Francisco, Cal., died recently at his home in that city.

George L. Lauer, 36, foreman at the Caden Stone Co., Evansville, Ind., died July 4 at a hospital in that city.

Edmund K. Swigart, 67, senior vice president of the Bucyrus-Erie Co., South Milwaukee, Wis., died July 7 at his estate on Ballard Lake, Wis., as the result of a heart attack. He joined the company in 1891 and was made secretary and treasurer in 1901.

Albert L. Krim, 60, former superintendent of the Falls City Quarry Co., Louisville, Ky., died recently at a hospital in that city.

William H. Bassett, 66, newly-elected president of the American Society for Testing Materials, died July 21 at his home in Cheshire, Conn. He was a pioneer metallurgist in the non-ferrous metal industry and at the time of his death was Metallurgical Manager, The American Brass Co., Waterbury, Conn.

Thomas H. Warren, 60, for many years president of the Jesse Allen Lime Co., Burns, Tenn., died recently at his home in Nashville, Tenn. He had not been active in business for 5 years.

W. W. Parker, a member of the crushed stone firm of Parker Bros., died recently in Astoria, Ore.

Coming Events

August 10, 1934, Chicago, Ill. —Meeting of lime manufacturers, Bismarck Hotel, to formulate marketing plan for high-calcium, chemical and industrial lime in Ohio.

August 16, 1934, Hot Springs, Va. Annual meeting of the board of directors of the National Crushed Stone Association, The Homestead, Hot Springs, Va.

September 3-8, 1934, Munich, Germany. Seventh International Road Congress and International Road Exhibition, American National Committee, 1723 N Street N.W., Washington, D. C.

December 3-8, 1934, New York, N. Y. Eleventh National Exposition of Power and Mechanical Engineering, Grand Central Palace, New York City.

1934 Road Congress is to be Held in Munich

The American National Committee of the Permanent International Association of Road Congresses has announced the program for the Seventh International Road Congress which will be held Sept. 3-8, 1934, at Munich, Germany. Conjointly with the Congress, the organization of an International Road Exhibition has been arranged. As in the past the program will be centered about the improvement of highway construction and maintenance methods, traffic safety, vehicle loads and other important problems. After the Congress there will be low-rate excursions starting at Munich and ending at the latest on Sept. 18 at Berlin where the congress will end with an official ceremony.

Fourth Largest Russian Cement Plant Operating

The fourth largest cement plant in the U. S. S. R. started operations in May. It is located at Kamensk, in the Ukraine, and will utilize the discarded slag of the Dzerzhinsky steel mill to produce a high-quality Portland cement.

New Corporations

HENRY COWELL LIME & CEMENT CO., San Francisco, Cal. Capital stock $500,000. Articles of incorporation filed with County Clerk Henry A. Pfister.

MCDOWELL-COOLEY GRAVEL CO., Kansas City, Mo. Incorporators, R. M. McDowell, Midland Bldg., Kansas City and C. G. Cooley, Chillicothe, Mo.

THE KANSAS CITY CRUSHED STONE CO., Kansas City, Mo. Incorporators, R. S. Eastir, J. M. McCune, and others.

VIGNUS QUARRY & MATERIAL CO., Vignus, Mo. Incorporators, M. D. McGuire and J. F. Ansbro, St. Louis, Mo.

GENERAL POTASH CO., Carlsbad, N. M. Capital 150,000 shares n.p.v. To begin business with 60,000 shares. Incorporators, C. L. Modesitt, A. X. Erickson and Emory L. O'Connell, Denver, Colo.

UNION SILICA CO., Louisville, Ky. Capital, $5,000. Incorporators, John H. Jefferson, Indianapolis, Ind., H. B. Hammond, Louisville, Ky.; and E. S. Monohan, Jr., St. Matthews, Ky.

GEORGIA SILICA & MINERAL CO., Dover, Dela. Capital $250,000. General mining business. Incorporators, M. M. Lucey, H. I. Brown and L. S. Dorsey, Wilmington, Dela. (Colonial Charter Co.)

TENNESSEE STONE CO., Knoxville, Tenn. Capital $10,000. Incorporators, Mrs. Hazel Ruth Schubert, P. D. Cate, and Louis B. Schneider.

LIMESTONE PRODUCTS CO., San Francisco, Cal. Authorized capital 4,000 shares preferred stock at par value $10; 10,000 shares common stock n.p.v. Mining enterprise.

WATERTOWN QUARRY, INC., Madison Wis. 100 shares @$10. Incorporators, F. Palmer, L. M. Alre, and F. Palmer.

Aggregates Statistics

By H. H. HUGHES

Bureau of Mines, Department of the Interior

THE upturn in industries consuming aggregates and related materials, so apparent during the latter half of 1933, was less pronounced during the first six months of 1934. All indicators, however, showed gains in 1934 compared with early 1933.

Table I compares 1934 with 1933; figures for six months are available for most indicators, for five months for the others. The same data are plotted by months in Fig. 1.

Construction Lags.—The year 1933 closed with renewed hope for the construction industry, contracts totalling $207,210,000 having been awarded in December. Since then, however, monthly awards have been much lower, the second quarter averaging only a little more than $130,000,000 a month. Public works projects are still carrying the bulk of the load, for the volume of residential contracts in May and June dropped even lower than in 1933. Private construction remains virtually stagnated and it is hoped that the National Housing Act, passed in the closing days of the last Congress, will provide the impetus necessary to raise residential construction to more satisfactory levels.

Engineering contracts and concrete-pavement contracts for six months of the year are considerably higher than 1933, but still far below the 10-yr. average from 1923 to 1932.

The situation in the construction industry is reflected in slight increases in shipments of Portland cement and demand for asphalt.

Industrial Production Higher.—The Federal Reserve Board index of industrial production rose from 77 in January to 89 in May, remaining in each month considerably above the 1933 level. A slump of 84 in June, however, caused it to drop below June of the previous year.

Production of both pig iron and malleable castings for six months of the year were far above 1933 but each showed a sharp decline in June.

Containers Lead Glass Industry.—Aided materially by the repeal of the Eighteenth Amendment production of glass containers for five months of 1934 has been maintained at a level far above the average for the past seven years. Production of plate glass for the first part of the year also has been higher than in 1933 but a great spurt will be required to equal the July and August record of a year ago. No illuminating-glassware output in 1934 has been maintained at a level above 1933.

Production in most industries dropped to record lows early in 1933. This to some extent tends to destroy the importance of 1934 increases, but figures for the last six months of the year will permit more significant comparisons.

TABLE I.—INDICATORS OF DEMAND FOR AGGREGATES AND RELATED MATERIALS FOR SIX MONTHS OF 1934 COMPARED WITH 1933[1]

	1933	1934	Increase from 1933 (*per cent*)
Construction-contract awards[2]:			
Total value	$432,752,000	$854,517,000	97.5
Residential floor space, *sq. feet*	33,557,000	34,372,000	2.4
Engineering-construction-contract awards[3]	$445,630,000	$630,974,000	41.6
Concrete-pavement-contract awards[4], *sq. yds.*	12,856,000	19,699,000	53.2
Portland-cement shipments[5], *bbls.*	27,927,000	35,169,000	25.9
Asphalt, domestic demand[6], *short tons*	627,728	675,875	7.7
Industrial production, unadjusted[7], *index number*	71	85	19.7
Pig-iron production[8], *long tons*	4,441,000	9,799,000	120.6
Malleable-castings production[9], *short tons*	110,689	214,041	93.4
Glass-container production[10], *gross*	8,186,000	14,574,000	78.0
Polished plate-glass production[11], *sq. ft.*	39,895,000	47,888,000	20.0
Illuminating-glassware production[12], *number of turns*	5,458	7,486	37.2

[1] Data are taken from Survey of Current Business, published currently by the Bureau of Foreign and Domestic Commerce, Washington, D. C. [2] F. W. Dodge Corp. [3] *Engineering News Record.* [4] Portland Cement Assn. [5] B. W. Bagley, U. S. Bureau of Mines. [6] A. H. Redfield, U. S. Bureau of Mines, 5 months only. [7] Federal Reserve Board. [8] *Iron Age.* [9] U. S. Bureau of the Census. [10] Glass Container Assn., 5 months only. [11] Plate Glass Manufacturers of America. [12] Illuminating Glassware Guild, 5 months only.

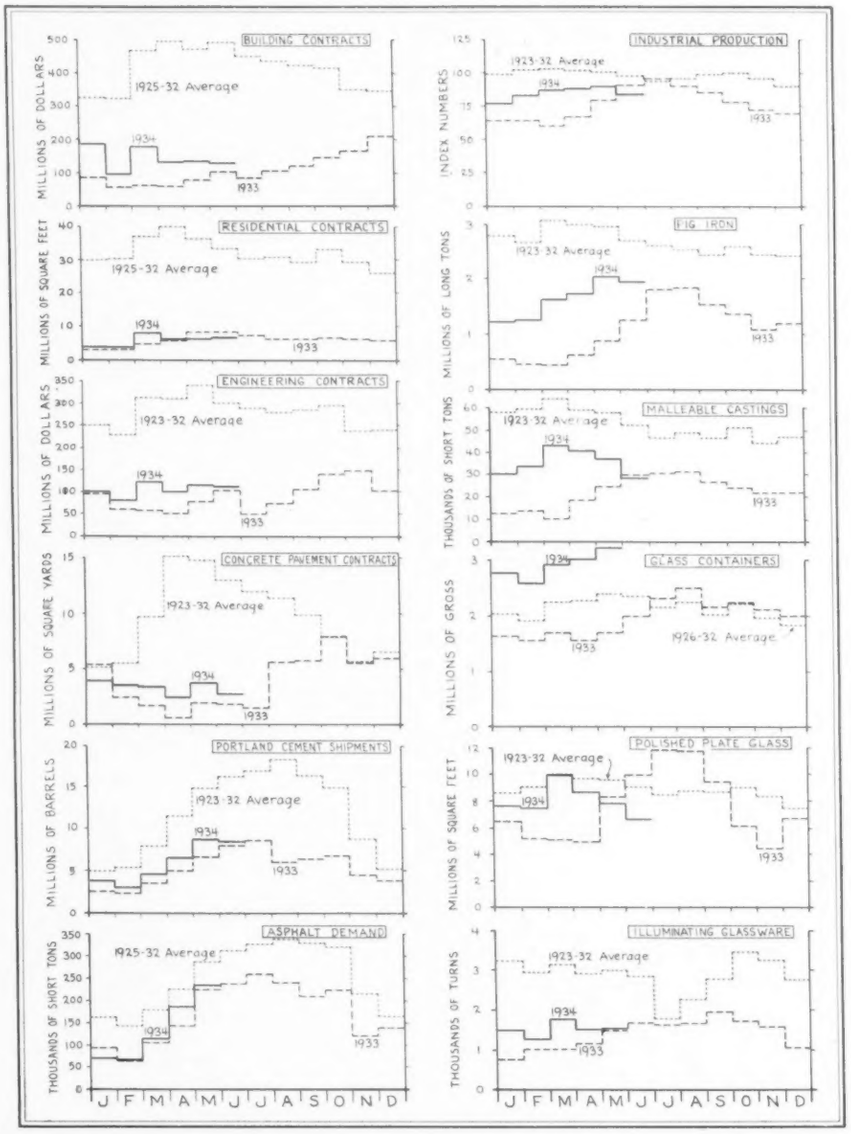


Fig. 1. Indicators of demand for aggregates and related materials in 1933 and 1934 compared with averages for previous years.

Latest Portland-Cement Statistics

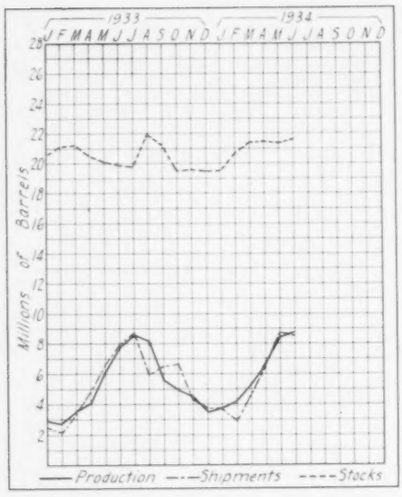


Chart showing monthly production, shipments and stocks on hand at end of month from January, 1933, to June, 1934.

THE Portland-cement industry in June, 1934, produced 8,786,000 bbl., shipped 8,539,000 bbl. from the mills, and had in stock at the end of the month 21,547,000 bbl. Production in June, 1934, showed an increase of 12.6 per cent. and shipments an increase of 7.0 per cent., as compared with June, 1933. Stocks at mills were 8.1 per cent. higher than a year ago. The total production for the first half of 1934 amounts to 37,088,000 bbl., compared with 27,668,000 bbl. in the same period of 1933, and the total shipments for the first half of 1934 amount to 35,163,000 bbl., compared with 27,927,000 bbl. in the same period of 1933. Estimates have been included in lieu of actual returns for two plants.

RATIO (*per cent.*) OF PRODUCTION TO CAPACITY

	June		May	April	March
	1933	1934	1934	1934	1934
The month	35.2	39.8	37.5	29.6	23.0
The 12 months ended	26.0	27.1	26.7	25.9	25.0

PRODUCTION, SHIPMENTS, AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1933 AND 1934 (*In thousands of barrels*)

Month	Production		Shipments		Stocks At End of Month	
	1933	1934	1933	1934	1933	1934
January	2,958	3,779	2,502	3,778	20,624	19,547
February	2,777	4,168	2,278	2,952	21,125	20,762
March	3,684	5,257	3,510	4,618	21,298	21,422
April	4,183	6,544	4,949	6,492	20,542	*a*21,557
May	6,262	8,554	6,709	*a*8,784	20,117	*a*21,301
June	7,804	8,786	7,979	8,539	19,936	21,547
July	8,609	.....	8,697	.....	19,848	.....
August	8,223	.....	5,994	.....	22,078	.....
September	5,638	.....	6,517	.....	21,216	.....
October	5,037	.....	6,750	.....	19,502	.....
November	4,672	.....	4,463	.....	19,709	.....
December	3,526	.....	3,738	.....	*a*19,541	.....
Totals	63,373	.....	64,086	.....	.....	.....

a Revised.

DISTRIBUTION OF CEMENT (*a*)

Shipped to—	May		June		Shipped to—	May		June	
	1933	1934	1933	1934		1933	1934	1933	1934
Alabama	130,896	56,284	128,627	54,337	New Jersey	252,625	252,487	243,872	270,397
Alaska	903	2,774	924	2,229	New Mexico	11,972	32,875	7,737	25,889
Arizona	13,226	22,759	10,014	24,885	New York	874,417	923,702	1,070,796	1,049,819
Arkansas	83,686	63,139	*b*84,181	46,216	North Carolina	41,121	61,300	46,758	61,447
California	489,827	472,667	473,303	463,606	North Dakota	17,159	36,042	24,427	32,055
Colorado	30,148	59,402	34,690	45,758	Ohio	292,022	443,918	389,377	483,707
Connecticut	123,156	112,171	104,706	124,743	Oklahoma	155,381	157,029	150,303	136,378
Delaware	47,636	38,443	31,197	45,803	Oregon	44,353	37,852	43,263	36,042
Dist. of Col	91,904	67,170	94,539	88,735	Pennsylvania	498,529	544,402	659,913	566,807
Florida	73,109	88,562	54,942	65,270	Porto Rico	7,191	10,132	6,250	11,988
Georgia	53,172	72,012	37,634	55,443	Rhode Island	47,818	39,543	56,332	53,074
Hawaii	11,044	23,741	12,717	30,006	South Carolina	26,530	24,582	17,301	28,877
Idaho	11,455	19,432	11,586	29,229	South Dakota	34,370	43,874	19,494	37,917
Illinois	177,861	671,643	347,314	557,475	Tennessee	128,277	172,233	*b*107,669	121,763
Indiana	172,464	335,335	350,728	326,093	Texas	360,532	347,606	339,004	324,339
Iowa	193,695	376,296	187,840	297,842	Utah	15,926	41,514	17,867	28,513
Kansas	81,970	193,532	92,726	153,683	Vermont	13,794	39,800	18,735	43,224
Kentucky	149,151	187,223	179,813	122,911	Virginia	100,649	128,834	117,078	140,554
Louisiana	64,344	103,895	59,178	81,409	Washington	52,800	125,718	58,175	97,178
Maine	33,625	27,518	60,431	37,802	West Virginia	54,844	134,170	59,554	115,949
Maryland	78,427	136,713	78,909	137,133	Wisconsin	178,181	291,111	328,486	379,484
Massachusetts	193,170	185,865	220,410	192,352	Wyoming	8,131	16,617	8,377	20,369
Michigan	295,721	423,275	514,119	473,640	Unspecified	5,235	5,597	*b*30,745	5,811
Minnesota	210,463	149,171	235,967	171,954		6,634,362	8,742,909	7,881,231	8,499,883
Mississippi	50,862	62,712	89,638	63,418	Foreign countries	74,638	41,091	97,769	39,117
Missouri	227,115	327,619	317,173	216,904					
Montana	20,183	32,594	23,086	29,299	Total shipped from cement plants	6,709,000	*b*8,784,000	7,979,000	8,539,000
Nebraska	225,751	198,856	135,231	185,585					
Nevada	51,316	284,406	61,124	231,532					
New Hampshire	26,225	36,762	27,171	73,010					

a Includes estimated distribution from 1 plant for May 1934; from 2 plants for January to March and for June, 1934; from plants for January to March, for May and June, 1933, and for April, 1934; from 4 plants for April, 1933. *b* Revised.

Sand-Gravel Producers Pleased with NRA Code

The Northwestern Pennsylvania Sand and Gravel Assn. held its monthly meeting and luncheon July 12 at Rockmere, Pa. The meeting was well attended and all present reported a good increase in the volume of business. The members were also reported as being enthusiastic over the accomplishments of the NRA and were agreed that the code was proving of great benefit.

Contractors in Western Pennsylvania Organize

Forty-six representative contractors in thirty-three counties of Western Pennsylvania have organized the Constructors' Assn. of Western Pennsylvania. Offices have been opened at 601 Columbia Bank Building and Roy A. MacGregor has been named executive secretary.

C. E. Lott of the John F. Casey Co. is president. Other officers are: A. R. Flinn, Booth & Flinn, vice-president in charge of railroad activities; William F. McCrady, McCrady-Rodgers Co., vice-president in charge of the highway division; R. B. Lee, secretary; and B. B. Byers, treasurer.

The objective is an association which can speak and act for its members as a unit in their industry. It will also strive to encourage river, highway and railroad construction and undertake to eliminate unfair and unethical practices.

It is expected that the association will expand its membership to include companies in northern West Virginia and eastern Ohio.

Ohio has 320 Producers Registered Under Code

The registered producers in Region 8 (Ohio) reached a total of 320 on July 25, according to Claude L. Clark, executive secretary of the Regional Committee. This number includes 116 crushed-stone producers, 195 sand-and-gravel producers, and 9 slag producers. Not included in these figures are 10 producers who are outside the region but ship into it—7 from Region 3 (Pennsylvania, New Jersey and Delaware), 2 from Region 4 (West Virginia, Virginia, Maryland and the District of Columbia), and 1 from these concerns have signed the compliance form and furnished tonnage affidavits.

Labor Conditions

ADVANCES in employment continued to characterize the labor situation in the nonmetallic-mineral industries in April, both the cement and the quarrying branches showing larger gains than in the preceding month.

Quarrying Industry.—Employment rose from 28,610 workers in March to 32,629 in April, the highest figure since last December. The employment index, which stood at 48.7 for the month (when compared with the 1923-1925, 3-yr., average as 100), showed a gain of 15.9 per cent. over March and of 23.9 per cent. over April of 1933 (Table I).

One-week pay-rolls reached $522,-154, the highest mark since last October. The index, 29.9, was 23.9 per cent. ahead of March and 48.0 per cent. above April a year ago.

Per-capita weekly earnings, $16, were the highest in more than 10 months, and exceeded those of March by 6.9 per cent. and those of April, 1933, by 19.5 per cent. The average number of hours worked per week rose to 34.2, the highest since last October, 4.0 per cent. above March, but 4.3 per cent. below the preceding April. Average hourly earnings were 46.9 c., a new "high," exceeding the March figure by 2.6 per cent. and that of April, 1933, by 27.1 per cent.

Increases in wages continued in April, the number of increases and the number of workers affected being the greatest since October of 1933 (Table II). Increases were put into effect in 20 plants and benefited 1,622 employees. There were no decreases reported.

A comparison of employment and pay-rolls in identical plants for March and April is given in Table III. In one state, Maine, employment increased 528.1 per cent. in the month of April, in New Hampshire 140.8 per cent., and in 12 other states (Colorado, Connecticut, Iowa, Maryland, Massachusetts, Missouri, Montana, Nebraska, New York, South Dakota and Wisconsin) the increase was more than one-third. The few decreases occurred chiefly in the South, the greatest being 35.8 per cent. In Tennessee and 23.6 per cent. in Mississippi. There was only one other decrease (Arkansas) over 10 per cent.

In many states (Connecticut, Illinois, Indiana, Kentucky, Maine, Maryland, Massachusetts, Michigan, Missouri, Nebraska, New Hampshire, Ohio, Pennsylvania, Virginia, Washington, and West Virginia) pay-rolls rose faster than employment, and in a few cases, where there were losses in employment there were gains in pay-rolls. In the far South pay-rolls declined faster than employment, disclosing the wage-depressing effect of increasing unemployment. In only one state, Utah, was an increase in employment accompanied by a decrease in pay-rolls.

Cement Industry.—Reports indicate a slight decline in employment in the cement industry for the 119 plants recorded in April. The number of employees reported by 120 plants in March fell to 12,414 in the 119 plants reporting for April (Table IV). The employment index, relative to the 1923-1925, 3-yr., average taken as 100, was 48.0, a gain of 13.3 per cent. for the month and of 24.0 for the year.

Despite the reduction in employment, pay-rolls increased from $224,-218 in March to $245,774 in April. The index, which was 24.1 in March, rose to 30.6 in April, a rise of 27.0 per cent. for the month and of 65.4 per cent. for the year.

Table I.—EMPLOYMENT, PAY-ROLLS AND EARNINGS IN THE QUARRYING AND NONMETALLIC-MINING INDUSTRIES, IN 1933 AND 1934, BY MONTHS

(Gains are shown in bold-faced type, losses in light-faced type)

Month	Establishments Reporting	Employment				Pay-Rolls				Per-Capita Weekly Earnings			Average Hours Worked per Week			Average Hourly Earnings		
		Employees on Pay-Rolls	Index of Employment[1]	Percentage Change From—		Amount of Pay-Rolls (1 week)	Index of Pay-Rolls[1]	Percentage Change From—		Average for Month	Percentage Change From—		Average for Month	Percentage Change From—		Average for Month	Percentage Change From—	
				Preceding Month	Year Ago			Preceding Month	Year Ago		Preceding Month	Year Ago		Preceding Month	Year Ago		Preceding Month	Year Ago
1933																		
July	1,134	33,044	49.5	**4.8**	[2]	$498,991	28.4	**3.6**	2.4	$15.10	1.2	2.4	41.4	**4**	.....	37.2c.	1.0	.....
August	1,142	34,553	57.6	**4.2**	**1.0**	520,098	29.9	**5.1**	**.7**	15.05	**.9**	.3	38.7	7.0	.....	40.4c.	**8.8**	.....
September	1,152	35,442	52.6	**1.9**	**.4**	516,932	29.3	2.0	3.9	14.59	3.8	4.3	34.4	1.11	.....	42.8c.	7.1	.....
October	1,202	36,894	53.2	**1.1**	**1.5**	566,803	31.2	**6.4**	**3.7**	15.36	**5.2**	**2.1**	34.8	**1.4**	.....	44.7c.	**3.5**	.....
November	1,185	34,303	51.1	3.9	**3.4**	497,238	28.3	9.3	**4.4**	14.50	5.5	**.9**	32.5	6.6	.....	45.2c.	**1.1**	.....
December	1,162	30,658	45.3	11.3	**7.1**	434,751	24.4	13.7	**10.4**	14.18	2.7	**3.3**	31.3	3.7	.....	46.1c.	**.9**	.....
1934																		
January	1,144	26,217	39.7	12.5	**13.1**	368,224	21.3	12.6	**17.7**	14.05	**.1**	**4.1**	30.8	1.9	.....	45.6c.	**.2**	.....
February	1,192	26,561	38.8	2.2	**11.5**	374,577	21.0	1.5	**20.7**	14.10	**.7**	**8.2**	31.1	**1.3**	.....	45.4c.	[2]	.....
March	1,180	28,610	42.0	**8.3**	**19.7**	434,572	24.1	**14.8**	**35.4**	15.19	**5.9**	**13.2**	33.5	**6.3**	2.7	45.6c.	**.7**	**17.7**
April	1,186	32,629	48.7	**15.9**	**23.9**	522,154	29.9	**23.9**	**48.0**	16.00	**6.9**	**19.5**	34.2	**4.0**	4.3	46.9c.	**2.6**	**27.1**
May	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
June	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

[1] Before March 1, 1934, the index numbers were based on 1926 = 100; since then they have been based on the 3-yr. average, 1923 to 1925, as 100.
[2] No change.

Table II.—CHANGES IN WAGE RATES IN THE QUARRYING AND NONMETALLIC-MINING INDUSTRIES, IN 1933 AND 1934, BY MONTHS

Month Ended	Establishments Reporting	Employees	No Change		Increases		Decreases	
			Establishments	Employees	Establishments	Employees	Establishments	Employees
July 15	1,144	26,217	1,138	26,149	6	68	.....	.....
Aug. 15	1,142	34,553	1,033	29,638	109	4,915	.....	.....
Sep. 15	1,152	35,442	1,059	32,390	93	3,052	.....	.....
Oct. 15	1,202	36,894	1,179	35,305	21	1,516	2	73
Nov. 15	1,185	34,303	1,178	34,132	7	171	.....	.....
Dec. 15	1,162	30,658	1,149	30,431	12	214	1	13
Jan. 15	1,144	26,251	1,138	26,149	6	68	.....	.....
Feb. 15	1,192	26,561	1,189	26,536	3	25	.....	.....
Mar. 15	1,180	28,610	1,179	28,550	1	60	.....	.....
Apr. 15	1,186	32,629	1,166	31,007	20	1,622	.....	.....
May 15	.....	.....	.....	.....	.....	.....	.....	.....
June 15	.....	.....	.....	.....	.....	.....	.....	.....

Table V.—CHANGES IN WAGE RATES IN THE CEMENT INDUSTRY, IN 1933 AND 1934, BY MONTHS

Month Ended	Establishments Reporting	Number of Employees	No Change		Increases		Decreases	
			Establishments	Employees	Establishments	Employees	Establishments	Employees
July 15	122	16,072	108	13,482	14	2,590	.....	.....
Aug. 15	111	15,787	60	5,081	51	10,706	.....	.....
Sep. 15	129	15,545	126	15,451	3	94	.....	.....
Oct. 15	131	13,199	128	12,609	3	510	.....	.....
Nov. 15	113	10,071	113	10,071	.....	.....	.....	.....
Dec. 15	129	10,851	129	10,851	.....	.....	.....	.....
Jan. 15	121	9,495	121	9,495	.....	.....	.....	.....
Feb. 15	125	12,745	125	12,745	.....	.....	.....	.....
Mar. 15	120	13,023	120	13,023	.....	.....	.....	.....
Apr. 15	119	12,414	96	7,694	23	4,720	.....	.....
May 15	.....	.....	.....	.....	.....	.....	.....	.....
June 15	.....	.....	.....	.....	.....	.....	.....	.....

Per-capita weekly earnings, which were $17.22 in March, reached $19.80 in April, an increase of 12.1 per cent. for the month and of 33.3 per cent. for the year. The April figure is the highest in 10 months. Average hours worked per week, 35.3 in April, was the highest since last August, 7.6 per cent. better than March, and 3.6 per cent. above April, 1933. Average hourly earnings were 55.5 c., just one-fifth cent. below the January "high," but 3.7 per cent. above March and 33.3 per cent. above a year previous.

Wage rates, which had seemed to be fairly well stabilized, showed fresh increases in April. In 23 plants wage-rate increases affecting 4,720 workers were put into effect. During the preceding 5 months no changes upward or downward had been reported.

Table III.—COMPARISON OF EMPLOYMENT AND PAY-ROLLS IN IDENTICAL QUARRY AND NONMETALLIC-MINING ESTABLISHMENTS, IN MARCH AND APRIL, 1934, BY STATES

(Gains are shown in bold-faced type, losses in light-faced type)

State	Number of Establishments	Number on Pay-Roll, April, 1934	Percentage of Change from March, 1934	Amount of Pay-Roll (1 week) April, 1934	Percentage of Change from March, 1934
Alabama	17	693	3.7	$7,275	11.1
Arizona	3	42	2.3	635	**8.0**
Arkansas	9	208	10.3	2,849	6.1
California	54	1,141	**8.9**	22,851	**6.3**
Colorado	5	43	**43.3**	453	**20.8**
Connecticut	23	281	**47.9**	4,904	**93.4**
Delaware	3	58	6.5	1,013	**8.2**
District of Columbia					
Florida	17	891	**2.4**	10,875	**2.6**
Georgia	24	1,258	.6	12,096	2.2
Idaho					
Illinois	20	569	**19.8**	10,238	**30.1**
Indiana	74	1,495	**20.0**	22,942	**26.1**
Iowa	29	496	**33.3**	7,374	**33.6**
Kansas	37	1,344	**.6**	24,893	.5
Kentucky	39	991	**10.5**	12,096	**27.2**
Louisiana	12	446	1.1	6,077	**4.5**
Maine	12	559	**528.1**	11,863	**821.0**
Maryland	9	231	**44.4**	3,215	**61.2**
Massachusetts	19	397	**46.5**	8,450	**61.7**
Michigan	52	1,484	**9.4**	25,970	**19.8**
Minnesota	23	244	**29.1**	3,779	**17.3**
Mississippi	9	152	23.6	2,542	3.1
Missouri	49	1,325	**46.7**	18,927	**49.5**
Montana	7	62	**37.8**	923	**16.7**
Nebraska	11	131	**48.9**	2,099	**107.6**
Nevada					
New Hampshire	11	248	**140.8**	6,685	**236.9**
New Jersey	36	569	**22.1**	10,149	**15.6**
New Mexico					
New York	79	2,340	**48.5**	46,001	**45.8**
North Carolina	14	439	8.7	7,187	**15.6**
North Dakota					
Ohio	137	3,401	**14.2**	54,610	**24.9**
Oklahoma	16	169	**7.0**	1,945	**9.3**
Oregon	3	26	(1)	595	**1.7**
Pennsylvania	165	4,998	**23.7**	80,272	**40.9**
Rhode Island					
South Carolina	4	116	**8.4**	1,145	**4.3**
South Dakota	6	59	**55.3**	918	**51.5**
Tennessee	25	826	35.8	10,394	37.5
Texas	23	1,490	**1.1**	27,273	**2.8**
Utah	7	106	**7.1**	1,607	5.2
Vermont	37	2,038	**2.3**	36,609	**1.9**
Virginia	29	979	**24.2**	12,130	**29.8**
Washington	12	275	**3.0**	5,522	**12.6**
West Virginia	20	882	**11.1**	12,587	**25.4**
Wisconsin	14	239	**58.3**	3,489	**34.1**
Wyoming					
Totals					

Jute Processing Tax Aid to Cotton Bag Makers

In a proclamation issued June 12 by H. A. Wallace, U. S. Secretary of Agriculture, puts into effect a processing tax of 2.9 c. per lb. of jute fabric on the first domestic processing of jute fabric into bags and a similar tax on the first domestic processing of jute yarn into twine of a length 275 ft. per lb., or over, finished weight of twine. This tax is imposed to prevent disadvantages in competition to manufacturers of cotton bags who are paying a processing tax under the Agricultural Adjustment Act which was approved by Congress May 12, 1933.

Adjustment Agency for Region 12 is Approved

The formation of a Regional Adjustment agency for the 12th region (Nebraska and Iowa) having been approved by the Trade Practice Complaints Committee of the mineral-aggregates industry's Code Authority, its organization has been undertaken and completed in accordance with the provisions of Bulletin 7 of the National Recovery Administration. The agency is composed of the following members:

W. M. Stoner (chairman), Reiners-Kaufman Co., Lincoln, Neb.

R. C. Fletcher, Flint Crushed Gravel Co., Des Moines, Ia.

H. E. Schellberg, Western Limestone Products Co., Omaha, Neb.

C. E. Thomas, Ideal Sand & Gravel Co., Mason City, Ia.

W. T. Kelley, Des Moines, Ia.

Complaints should be addressed to the chairman, P. O. Box 1546, Lincoln, Neb.

Table IV.—EMPLOYMENT, PAY-ROLLS AND EARNINGS IN THE CEMENT INDUSTRY, IN 1933 AND 1934, BY MONTHS

(Gains are shown in bold-faced type, losses in light-faced type)

Month	Establishments Reporting	Employment				Pay-Rolls				Per-Capita Weekly Earnings			Average Hours Worked per Week			Average Hourly Earnings		
		Employees on Pay-Rolls	Index of Employment[1]	Percentage Change From—		Amount of Pay-Rolls (1 week)	Index of Pay-Rolls[1]	Percentage Change From—		Average for Month	Percentage Change From—		Average for Month	Percentage Change From—		Average for Month	Percentage Change From—	
				Preceding Month	Year Ago			Preceding Month	Year Ago		Preceding Month	Year Ago		Preceding Month	Year Ago		Preceding Month	Year Ago
1933																		
July	122	16,072	46.1	**7.9**	**13.5**	$274,777	25.7	**9.8**	**6.6**	$17.10	**1.8**	6.3	38.9	1.5	.....	43.9c.	**3.4**	.....
August	111	15,787	48.8	**5.8**	**28.4**	287,508	29.5	**15.0**	**26.1**	18.21	**8.7**	1.5	36.0	7.4	.....	50.2c.	**17.0**	.....
September	129	15,545	44.0	9.7	**5.0**	256,836	23.9	19.0	2.4	16.52	10.4	7.3	31.8	11.6	.....	52.2c.	**3.9**	.....
October	131	13,119	38.0	13.7	11.4	240,984	22.9	4.5	9.1	18.37	**10.7**	**2.1**	34.5	**8.4**	.....	54.3c.	**4.0**	.....
November	113	10,071	37.8	.4	7.8	177,760	21.2	7.1	8.6	17.65	6.7	.8	32.0	7.2	.....	52.8c.	2.7	.....
December	129	10,851	33.6	11.3	**2.1**	172,067	17.6	17.1	**2.3**	15.86	6.6	**.2**	28.5	10.9	.....	54.2c.	**2.6**	.....
1934																		
January	121	9,495	32.6	2.8	**8.7**	164,507	17.9	**1.7**	**19.3**	17.33	**4.6**	**9.3**	31.4	**7.9**	.....	55.7c.	1.1	.....
February	125	12,745	37.6	**15.2**	**26.6**	212,111	20.8	**16.2**	**39.6**	16.64	**.8**	**10.2**	30.8	**4.1**	.....	53.1c.	1.7	.....
March	120	13,023	42.4	**3.4**	**30.1**	224,218	24.1	**7.0**	**46.1**	17.22	**3.5**	**11.7**	31.9	**4.6**	10.6	53.6c.	**.2**	**29.9**
April	119	12,414	48.0	**13.3**	**24.0**	245,774	30.6	**27.0**	**65.4**	19.80	**12.1**	**33.3**	35.3	**7.6**	**3.6**	55.5c.	**3.7**	**33.3**
May																		
June																		

[1] Before March 1, 1934, the index numbers are based on 1926 = 100; since then they have been based on the 3-yr. average, 1923 to 1925, as 100.

Foreign Developments

Calcium Hydrosilicate and Setting of Cement

Dr. Louis Chassevent (Paris) reports in *Zement* for April 26 (23:237-240) some investigations conducted by him and Professor Jolibois on the formation of calcium hydrosilicate, which he offers for the light they shed on the setting of Portland cement and because he believes they explain the differences between recent conclusions by Koyanagi and those by Kühl and Wang. The former (in *Zement* 1933, No. 51, p. 705) in investigations on the hydration of calcium silicate in Portland cement found the formation of a monocalcium hydrosilicate SiO_2:CaO.$2H_2O$. Kühl and Wang (*Zement* 1932, Nos. 8, 9, 10, pp. 105, 120, 134) stated the product of the reaction as $2SiO_2$:3CaO.nH_2O.

Jolibois and Chassevent studied the formation of the calcium hydrosilicate by mixing calcium oxide and silica. The soluble silica coagulates instantly and completely in the presence of concentrated lime solutions. This, the author says, explains why no silica is found in working with Portland cement and water in filtered solutions. These solutions are of course saturated or super-saturated in lime. They cause the silica to coagulate instantly at the beginning of the reaction of the cement.

The silica gel combines with lime and forms monocalcium aluminate CaO.SiO_2.aq., the hydrolysis of which corresponds to a lime concentration of 0.063 g. CaO per liter at 30 deg. C.

In the presence of an excess of lime in the solution the hydrosilicate proceeds for months to take up lime by adsorption. Koyanagi reached the correct conclusion (formation of monocalcium hydrosilicate) because he removed the adsorbed lime with glycerin.

The hydrolysis of the monocalcium hydrosilicate yields a lime solution of a concentration sufficient to coagulate more silica than it contains in lime. This fact makes it possible to explain the hardening of materials containing a high percentage of soluble silica, such as the puzzuolans and granulated slag, to which small amounts of lime or Portland cement are added.

Germany Producing New Light-Weight Aggregate

A Berlin construction firm has recently patented a process for making light-weight concrete by means of porous burned-clay coarse aggregate. The material is said to develop considerably better strength than light-weight concrete made with similar artificial aggregates available in Germany or with other light-weight aggregates such as pumice or cinders.

The aggregate is made by grinding or kneading clay with lignite or sawdust, then cutting it into small pieces and passing it over a vibrating screen to roll it into balls. These go into a kiln where during about 40 min. the temperature is gradually increased from 100 to 300 deg. C. and dropped again. The pieces so resulting are then given a thin coating of unburned clay and then pass to a rotary kiln, where their temperature is raised from 300 to 1,100 deg. C. In the first kiln the fuel mixed with the clay is burned, leaving the clay porous. In the second kiln the clay coating and the porous interior are hardened. The resulting aggregate is light in weight but at the same time does not weaken the mortar or concrete by absorbing cement into the pores of the aggregate.—Friedrich Huth, *Tonindustrie-Zeitung* 58:418-419, April 26, 1934.

Measures the Properties of Gypsum by Density

A new method for the testing of the properties of gypsum and plaster is discussed briefly in *Revue des Materiaux de Construction* for June (No. 297, pp. 161-163) by Pierre Migny. The apparatus employed is not described, other than stating that it depends on the measurement of the change of volume, based on the change in density from one form of calcium sulphate to another, rather than the simple swelling. In this article the writer shows the close correspondence of this method applied to the testing of the set and hardening of plaster with other methods of testing the same phenomenon. Other articles showing the application of the method to the testing of other properties are to follow.

Slag Concrete Blocks Tested After 27 Years

In 1905 a protective wall against a mole in the harbor of Piombino, Italy, was built of concrete blocks made of a mix consisting of 65 per cent. limestone coarse aggregate, 26.25 per cent. of granulated slag (not pulverized) and 8.75 per cent. slaked lime. Last year a diver brought up several blocks which had been under about 6 ft. of water 27 yr., and Dr. Vieri Sevieri of Florence made a series of tests on them and on the materials in them.

The compressive strength tests were made on cubes sawed out of the blocks at a near marble works, and Sevieri believes this method of obtaining the test specimens decreased the strength showings about 30 per cent. The actual results were 191 kg. per sq. cm. for the lowest and 287 kg. for the highest, with an average of 245 kg. per sq. cm., which Sevieri calculates to represent a true strength of about 350 kg. per sq. cm. The cubes with the lowest strength results came from the center of the block.

Specimens tested for permeation were only slightly permeable at 1 atmosphere, but permeable (0.064 to 0.124 cu. cm. per sq. cm. in 1 hr.) at 2 atmospheres.

A notable discovery in the chemical analyses of the binder, as compared with the analysis of the original material, was that although in the original material almost all the silica was soluble, in the binder recovered from the blocks about three-fourths of the silica present was insoluble. Also other compounds insoluble in HCl had developed: calcium silicate, calcium aluminate and calcium alumino-sulphate. These compounds were uniformly distributed and indicated that the composition of the mortar had reached an equilibrium in relation to the sea water which did not show any further change in spite of long presence in the water. Tests for free lime showed only traces or none.

Another interesting result was that the SO_3 content had increased, although the total sulphur content had decreased about one-half. This is explained not by the oxidizing of sulphide to sulphate (the amounts present do not justify such an assumption), but by the leaching out of sulphide, on the one hand, and the formation of calcium alumino-sulphate by reaction with the magnesium sulphate of the sea water.

Several pieces of iron, apparently dropped into the concrete by accident, were discovered embedded in the blocks while sawing them apart. They were in excellent condition, even the thread of a screw. This fact, along with the fact that the mortar was adhering well to the iron parts and along with the chemical data discovered, support the possibility of using slag in reinforced concrete for marine construction.

Sevieri's report is contained in an address made in Italy and printed in translation in *Tonindustrie-Zeitung* 58:587-589 and 601-602, June 18 and 21, 1934.

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Develop Apparatus for Sintering Cement Mix

A new type of cement-burning apparatus developed by the Metallgesellschaft of Frankfurt-on-Main has so many apparent advantages that E. Schirm, who discusses it in *Zement* (23:317-323, June 7, 1934), predicts its introduction in many plants; in fact, the writer ventures a prediction that it may bring about a revolution in the cement industry.

This apparatus is a traveling-grate sinterer, and in some respects resembles the sinterer for preheating cement raw material in the Lepol kiln. However, the sinterer in the Lellep process is operated in connection with a rotary kiln, whereas the new apparatus is complete in itself. Furthermore, in the sintering apparatus of the Lepol kiln the discharge gases from the rotary kiln provide the heat and no fuel is admixed with the charge, while in the new sinterer the fuel is mixed with the charge and is fired as the material moves through.

The greatest difficulty—one that has never been overcome in attempting to burn cement on a sintering grate—is that the charge could not be burned evenly; there was always a certain amount of overburning (fusing) and some underburning. Good-enough results could be obtained if in one step (either on a sintering grate or otherwise) the material were calcined and in a separate step the calcined material were sintered to the degree appropriate to cement clinker. The worst objection to this was the loss of heat between the two stages.

It has even been discovered that it is possible to load a grate with two layers of material: one layer of material to be calcined, and another layer, previously calcined, to be sintered. As the material issued from the sintering apparatus it was screened to separate the clinkered sintered material from the powdery material merely calcined, which would be mixed with more fuel and passed over the grate again for clinkering. This process, however, did not do away with the objection that heat is lost in the two stages of separate calcining and sintering.

The new sintering grate of the Metallgesellschaft is based on experimental data which show that material can be perfectly sintered in a single step if the mixture contains only so much material requiring heat for decomposition that 50 per cent. of the fuel suffices to furnish such heat of decomposition. In the burning of cement, specifically, only about 40 per cent. of the charge should be material requiring the driving off of carbon dioxide; the remainder of the charge being raw-material components that do not decompose (*e.g.*, alumina) and previously-burned clinker. The exact amount of clinker to be mixed with a charge of fresh material is to be determined in accordance with the nature of the raw material employed. A thin layer of clinker is spread next the grate for the protection of the latter.

In an experimental mixture of 50 kg. of $CaCO_3$, 50 kg. of blast-furnace slag, 40 kg. of clinker, 7 to 8.5 kg. of coke and a little water for dampening the charge, the lime content was 35.7 per cent., and only 36.2 to 43.4 per cent. of the heat developed was employed for the calcination of the lime. In this case the fuel consumption amounted to 640 to 770 cal. per kg. of clinker produced (not counting the old clinker added).

Another experimental mixture was 75 kg. of $CaCO_3$, 25 kg. of alumina, silica and Fe_2O_3, 100 to 120 kg. of clinker, 13 to 15 kg. of coke, and water. Here the lime content is 34 to 37.5 per cent., and 46.4 to 54.2 per cent. of the heat was used in calcining. The fuel consumption was 900 to 1050 cal. per kg. of new clinker produced. Schirm says that in mixtures with customary lime content the fuel consumption runs as low as around 800 to 850 cal. per kg. of clinker.

The quality of the cement produced is reported to be fully up to standard, varying, as in other kilns, with the care devoted to the preparation of the raw mix, the fineness of the grinding, and similar factors. The thickness of the layer on the grate may vary, but will probably be between 10 and 40 cm. It has no chance to separate into unequal sizes, and is not subject to the irregularities of burning as in a shaft kiln. One of the most striking advantages is that the operation can be shut down and started again without considerable loss of heat, so that it is possible to operate on a single-shift basis. Also, the grate can be installed and used in any of a considerable variety of sizes with a correspondingly wide choice in the matter of installation costs.

Finds Standard-Sand Tests Not Dependable

A Swiss writer (F. Richner, Au/Wildegg, Switzerland) in *Tonindustrie-Zeitung* for June 7 (58:548-560) discusses a series of experiments which convince him that cement strength tests with "standard sands" do not reveal the true differences of quality between cements. His observations began with the check of a cement which, although of equality with a second brand in standard-sand tests, ran considerably lower in strength when used with building sand. Experiments led to the discovery that the first cement needed a correction in its composition (a slight increase in SO_3), although this had not been discovered in the laboratory.

In a series of tests comparing three brands of cement when made into mortar with standard sand and with six different sands from practice, each of the cements made the best strength showings with certain of the sands, and there was no direct correspondence with standard-sand results.

Throws Light on Yield of Lime in Hydration

Studying the causes of the "yield" of quicklime on hydration, Dr. W. Dawihl made two series of tests on the removal of water from a lime putty slaked directly from quicklime. One method was to dry the putty over 50-, 70- and 85-per cent. sulphuric acid; the other method employed a new method devised by Prof. Ebert, in which the putty is shaken with an organic solvent, dioxane, and the water content of the solvent checked at intervals by measuring the diëlectric constant. The apparatus is called a "diëlcometer". In each test it was found that all the water down to 4 to 5 per cent.—about10 per cent. in proportion to the calcium hydroxide—is reabsorbed almost immediately, indicating that in the putty the excess water is present in the cavities between the individual particles. The 4 or 5 per cent. that is slower in being reabsorbed is apparently combined at the surfaces; it is removed fairly rapidly in comparison to the removal of water from typical swollen substances, such as starch.

In a putty made from dry hydrate all the water down to below 1 per cent., in the case of drying over sulphuric acid, is removed almost at once. Dr. Dawihl comments that the difference between the yield of dry hydrate and quicklime on hydration is due to the difference in the surface reactions. In the case of hydrating quicklime there is an excess of water and the more active surfaces result in the surface combination of the 4 per cent. of water. In the dry hydration of lime there is no excess of water, higher temperatures are developed, there is a "shriveling" of the surfaces, and the capacity for combination with water is reduced.

Dr. Dawihl discusses his experiments and the results in *Tonindustrie-Zeitung* 58:561-562, June 11, 1934.

U. S. Tyler Co. Purchases Niagara Product Patents

The W. S. Tyler Co., Cleveland, O., announces that it has acquired all the United States patents and pending patent applications under which a complete line of vibrating screens, washing and scrubbing apparatus has heretofore been manufactured by the Niagara Concrete Mixer Co., Buffalo, N. Y. The company also announces that, effective immediately, all orders for screens, scrubbers and screen replacements, heretofore manufactured by the Niagara company, may be sent direct to the W. S. Tyler Co. at Cleveland O., where a stock of repair and replacement parts will be carried.

The Allis-Chalmers Mfg. Co., Milwaukee, Wis., announces the removal of its Chicago offices to the new Field Bldg., 135 South La Salle St. B. F. Bilsland is manager.

Traffic News and Comment

Recent I. C. C. Decisions

Cement.—In response to Fourth Section Application No. 15,507, the Commission has authorized the carriers parties to Boyd's I. C. C. Nos. A-2,033 and A-2,179 to establish rates on cement from Limedale, Mitchell and Speed, Ind., to destinations in Iowa, Kansas, Nebraska, and Northern Missouri, *via* circuitous routes, the same as those contemporaneously in effect by way of the short lines or routes, on the basis of the rates prescribed in Western Cement Rates, 69 I. C. C. 644, to apply from Illinois points to the same destinations, and to maintain higher rates to intermediate points; subject to the usual 33⅓-, 50- and 70-per cent. circuity limitations, and to the condition that rates to the higher-rated intermediate points shall not exceed those made by use of the same distance scale or shall not exceed the lowest combinations.—I. C. C. F. S. O. No. 11,622.

Lime.—A recent action taken by the Commission is somewhat out of the ordinary. In an I. & S. proceeding the Commission found the rates on lime from, to and between points in the southwest as proposed by the carriers not justified and ordered cancellation of the suspended schedules. At the same time a scale of rates which the Commission considered reasonable was included in the report but was not prescribed or ordered published. The carriers considered this basis too low and cancelled the suspended rates but published as a new basis a percentage of the first-class rate. Certain shippers asked for a suspension of this basis, and the Commission has now ordered the carriers to establish rates on the basis found reasonable in the original report. Since this order was served the carriers have asked for a re-opening of the case. The basis to be followed, in the words of the Commission, is "that the said respondents, according as they participate in the transportation, be, and are hereby notified, and required to establish, on or before Sept. 26, 1934, upon notice to this commission and to the general public by not less than 30 days' filing and posting in the manner prescribed in Sec. 6 of the Interstate Commerce Act, and thereafter to maintain and apply, for the interstate transportation of all kinds of lime, in car-loads, (1) between all producing points embraced in the schedules under suspension in these proceedings in southwestern territory and southern Missouri as these territories are defined in Consolidated Southwestern Cases, 123 I. C. C. 203, and in Ohio, Alabama, Tennessee and northern Missouri, and between Quincy and Marblehead, Ill., on the one hand, and all destinations embraced in the schedules under suspension in these proceedings in said southwestern territory and southern Missouri on the other, and (2) from all the aforesaid producing points to Texas-Oklahoma differential territory as defined in Consolidated Southwestern Cases, *supra*, (a) rates, minimum 30,000 lb., which shall not exceed rates made on the bases of the scales of rates and differentials set forth in Appendix D to the aforesaid report of June 24, 1933, made a part hereof, based upon the distance over the shortest route over which car-load traffic can be moved without transfer of lading; provided that to points in the Texas-Oklahoma differential territory the resulting rates shall be made by adding to the scale rates based on the through distance differentials as set forth in said appendix for the distance in differential territory over the rate making route; and (b) rates, minimum 50,000 lb., which shall not exceed 80 per cent. of the resulting rates, minimum 30,000 lb., fractions of a cent below 0.25 to be disregarded, 0.25 to but not including 0.75 to be regarded as 0.5 cent, and 0.75 to be regarded as a full cent; provided further (1) that the grouping of origin points and the distances to be used from said groups shall be those set forth in the third last paragraph on pp. 580 and 581 of the aforesaid report made a part hereof; (2) that the rates resulting from the foregoing bases shall be published as specific rates from all the producing points to all destinations in the respective territories aforesaid to which there is now or likely to be a car-load movement of lime; and (3) that in publishing rates on the foregoing bases respondents are not authorized to exceed in any respect the aggregate of intermediate rates contemporaneously in effect."—I. C. C. I. & S. Docket No. 3,742 and No. 3,776, Lime, from, to and between points in the Southwest.

Ground or Crushed Limestone.—The Commission has prescribed a scale of rates to apply between points in trunk-line territory and from points therein to destinations in New England, and a different scale to be used in awarding reparation on shipments which have moved, to apply on ground or pulverized limestone, car-load minimum weight 50,000 lb. Rates for the future and for reparation purposes for both single and joint hauls are made on scales of which the following rates are typical:

	Future		Reparation	
Miles	Single	Joint	Single	Joint
5	$0.60	$0.80	$0.70	$0.95
50	1.00	1.20	1.20	1.45
100	1.35	1.50	1.65	1.80
200	1.85	1.85	2.20	2.20
300	2.25	2.25	2.70	2.70
400	2.65	2.65	3.20	3.20
500	3.05	3.05	3.65	3.65

Rates on ground or pulverized limestone from Martinsburg, Engle and Millville, W. Va., and Lime Crest, N. J., to destinations in trunk-line territory were found unreasonable to the extent that they exceeded the rates set forth in the table subject to the addition of 70 c. a ton for hauls involving carfloat or lighterage service in the New York harbor district to New York destinations, including desinations on the Long Island R.R. located in Group A, and subject to the addition of an arbitrary of 25 c. a ton to points on short or weak lines; and also that the rates to points in Long Island outside Group A should be made by adding to the rates prescribed to Group A arbitraries of 25 c. to Group B, 40 c. to Group C, and 70 c. to Group D. Rates on ground limestone from Bellefonte and Pleasant Gap, Pa., to destinations in New York north of New York City were found unreasonable, unduly prejudicial and unduly discriminatory. Reasonable rates in this case are to be made on the scales shown above plus the added arbitrary of 25 c. where short or weak lines are involved. It was further found that the rates were and for the future would be unreasonable as they applied on pulverized or ground limestone from Lime Crest, N. J., to destinations in New England, to the extent that they exceeded or might exceed the rates set forth in the above table plus arbitraries a net ton for hauls in New England of 30 c. for 50 mi. and under; 35 c. for 100 mi. and over 50; 40 c. for 160 mi. and over 100; 45 c. for 220 mi. and over 160; 50 c. for 280 mi. and over 220; 55 c. for 340 mi. and over 280; 60 c. for 400 mi. and over 340; 65 c. for 460 mi. and over 400; and 70 c. for over 460 mi.; provided that to destinations on recognized short or weak lines there might be added an additional arbitrary of 25 c. a net ton; subject also to the addition of an arbitrary of 70 c. a net ton for hauls involving a car-float or lighterage service in the New York Harbor district.

The rates on crushed stone from Lime Crest, N. J., to destinations in trunk-line territory were found to be unreasonable for the past and for the future to the extent that they exceeded or might exceed rates made by use of the basis prescribed in National Slag Co. v. Atlantic City RR. Co., 181 I. C. C. 699, distances to be computed in the manner set forth in that case, except that movements from Lime Crest in connection with any carrier other than the Lehigh & Hudson River Rwy. Co., should be considered as joint-line hauls. In all cases where the rates were found unreasonable reparation was awarded, subject to the condition that there might be added the authorized emergency charges which might have been simultaneously in effect.—I. C. C. Docket No. 25,220, American Lime & Stone Co. *et al. v.* Pennsylvania *et al.*; No. 24,757, Limestone Products Corp. of America *v.* Lehigh & Hudson River *et al.*; No. 24,432, Washington Building Lime Co. *et al. v.* Atlantic City Railroad *et al.*; and Sub No. 1, Same *v.* Baltimore & Eastern *et al.*, and Sub No. 2, Warner Co. *v.* Atlantic City Railroad *et al.*

Sand.—The Commission has awarded reparation on finding the rate on sand from Hawarden, Ia., to Canton, S. D., unreasonable on shipments made during September and October, 1929, to the extent that it exceeded 70 c. a net ton. As the present rate is lower, no order for the future is necessary.—I. C. C. Docket No. 25,675, Booth & Olson, Inc. *v.* C. M. St. P. & P.

Sand and Gravel.—The Commission has awarded reparation on finding the rate on sand and gravel from Machias, N. Y., to Bradford, Pa., on shipments made between Aug. 7 and Oct. 22, 1930, unreasonable to the extent that it exceeded $1.00 a net ton.—I. C. C. Docket No. 26,094, McHugh Bros. *v.* Pennsylvania *et al.*.

Examiners' Reports

Cement.—On petition of the Iola Cement Mills Traffic Assn. and other cement companies the Commission re-opened for further hearing cases in which rates had been prescribed on cement from and to points in Texas. In these cases mileage scales were prescribed, and rates made on these scales for intrastate application in Texas became effective Dec. 12, 1927. Early in 1929 exceptions to these scale rates began to be made on Texas intrastate traffic and since that time these exceptions have grown in number and importance. Petitioners allege that these exceptions result in undue prejudice to themselves and undue preference of shippers located in Texas. Defendant carriers contend that the rates were reduced to meet motor-truck competition. At first a few rates were made to meet this competition on a checked-in point-to-point basis, but in April 1933 on authority of the Texas Commission the carriers published a mileage scale of rates for application on intrastate traffic, car-load minimum weight 50,000 lb., ranging from 4 c. for 20 mi. and less to 10 c. for hauls of 75 mi. and over 70 mi. While petitioners admitted the reduced rates were made to meet truck competition, they contended that such rates were not necessary as shippers had discontinued shipping by truck, and that the cause for the establishment of the reduced rates was the threat of some Texas cement manufacturers that they would again open their plants to trucks. While petitioners maintained that the code of fair competition for the cement industry might result in the mills being forced to transport their products by railway rather than by truck, it was developed that the code contains the following provision: "The seller reserves the right to select the route and method by which shipments shall be forwarded, but no seller can be required to

favor any one route or method of transportation as against another by any joint action of the members of the industry or the Code Authority; transportation charges per tariff applying from shipping point to place of delivery for route and method of shipment used, will be paid by the buyer for the account of the seller." A modification of the intrastate scale was to become effective July 1, 1934, which would result in an increase in the rates for distances from 30 to 50 mi. of ½ c. and for distances over 50 mi. to 70 mi. of 1 c., which rates the carriers feel is all that the traffic will bear. Some Texas producers testified that any material increase in the Texas intrastate cement scale would again force the traffic to trucks. Examiner R. G. Taylor recommended that the Commission find "that truck competition compels the Texas carriers to maintain lower intrastate rates on cement than the normal basis, and that the evidence fails to establish that the reduced rates now in effect, or those to become effective July 1, 1934, are lower than reasonably necessary to meet such competition. Although not admitting that the reduced intrastate rates are justified for hauls of less than 30 mi., petitioners on brief contend that trucking of cement in Texas is inconsequential where the hauls are over 30 mi., and, therefore, that the reduced rates are certainly not warranted for hauls in excess of that distance. The evidence fails to support this contention. On cross examination petitioners' principal witness admitted that if the Texas carriers had not reduced their Intrastate rates, and the Texas shippers and consumers could have had their cement trucked at a cost not exceeding, and perhaps less than, the rates the carrier established, the interstate shippers would not have been placed in any better position. The Commission should find that the occasion for the establishment of the reduced intrastate rates on cement in the state of Texas was the existence of compelling truck competition either actual or impending; that they grew out of changed conditions that have arisen since the prior proceedings in these cases; and that they are not unduly prejudicial to petitioners or interveners, or otherwise unlawful. An order should be entered denying the relief prayed in the petition and the complaints should be dismissed.—I. C. C. Docket No. 15,427, Iola Cement Mills Traffic Assn. *et al. v.* Abilene & Southern *et al.*; and No. 21,164, Iola Cement Mills Traffic Assn. *et al. v.* Same.

Examiner T. K. Carpenter proposes that the Commission award reparation on finding that the rates on cement from Dewey, Okla., to Kilgore, Mart, Arp, Burkburnett, Waco and Overton, Tex., and Fredonia, Kan., to Waco, Tex., were unreasonable to the extent that they exceeded 21½ c. to Kilgore, Arp, Waco and Overton, 22½ c. to Mart, and 24 c. to Burkburnett, on shipments delivered between Mar. 14 and Sept. 10, 1932.—I. C. C. Docket No. 26,421, Dewey Portland Cement Co. *v.* I.-G. N. *et al.*; and Sub. No. 1, Same *v.* A. T. & S. F. *et al.*

Crushed Stone.—Examiner C. Gorofalo recommends that the Commission find the interstate rate on crushed stone from Boxley, Va., to Bowers, Va., not unreasonable and dismiss the complaint in No. 26,348, Robert G. Lassiter & Co. *et al. v.* A. C. L. *et al.*

New Complaints Filed

Silica Sand.—Reparation is sought on an allegation of unreasonable rates and charges on silica sand from the Ottawa, Ill., district to Cleveland, O., in I. C. C. Docket No. 26,554, Grasselli Chemical Co., Cleveland, O. *v.* C. B. & Q. *et al.*

Slag and Gravel.—Charging violation of Sec. 1 in connection with the rates on granulated slag from Copperhill, Tenn., to Franklin, O., and on crushed gravel from Pacific, Mo., to Franklin, O., complainant asks for reparation in I. C. C. Docket No. 26,552, Logan Long Co., Chicago, Ill. *v.* C. C. C. & St. L. *et al.*

Recent Patents

AMERICAN

Cement

Cement product and method of making. Howard R. Starke, Riverside, Calif., assignor to Riverside Cement Co. No. 1,947,504.

Method of making cement. Willoughby E. Snyder, Allentown, Pa. No. 1,948,433.

Apparatus for manufacturing cement and like. Arno Andreas, Munster, Germany. No. 1,948,742.

Process of manufacturing cementitious materials. Alton J. Blank, Puebla, Mexico, assignor to Cement Process Corp. No. 1,953,924.

Process and means for burning cement slurry. Adolphe Busch, Antwerp, Belgium. No. 1,954,401.

Manufacture of hydraulic cement. Knud Folke and Henning Hansen, Copenhagen, Denmark, assignors to F. L. Smidth & Co., New York, N. Y. No. 1,955,121.

Apparatus for preliminary treatment of raw material mixed for cement burning. John S. Fasting, Valby, Denmark, assignor to F. L. Smidth & Co. No. 1,955,277.

Apparatus for producing cement and similar substances. Karl E. E. Holzapfel, Munster, Germany. No. 1,955,914.

Apparatus for treating cement slurry and like. Alexander Hasselbach, Dessau, Germany. No. 1,957,138.

Production of cement. Eugene J. Wechter, Speed, Ind., assignor to Louisville Cement Co. No. 1,957,415.

Process of making colored cement. John Finn, Jr., Berkeley, Calif. No. 1,958,615.

Concrete

Hardening and waterproofing compound for cement and concrete mixtures. Richard E. A. De Bow, Bradley Beach, N. J., assignor to Aqua-Pruf, Inc., Newark, N. J. No. 1,951,186.

Crushing

Crusher. Harvey H. Rumpel, Milwaukee, Wis., assignor to Smith Engineering Works. No. 1,957,228.

Elevating

Portable bucket elevator. Oscar B. Jones, Columbus, Ohio, assignor to Jeffrey Mfg. Co. No. 1,955,238.

Excavating

Excavating-machine. Glen B. Heffelfinger, Marion, Ohio, assignor to Marion Steam Shovel Co. No. 1,951,410.

Lime

Process for treating lime. William J. Kuntz, York, Pa. No. 1,954,211.

Screening

Conveyor or screening apparatus. Scott Symington, London, England, assignor to Woodall-Duckham (1920) Ltd., same place. No. 1,958,322.

Transportation

Car for mines and like. Harry J. Hick, Alliance, Ohio, assignor to Machined Steel Casting Co. No. 1,950,175.

Mine-car. Frederick H. Gibbs, Brooklyn, N. Y., assignor to American Car & Foundry Co. No. 1,956,792.

Washing

Gravel washer and separator. Andrew M. Lockett, New Orleans, Pa., assignor to A. M. Lockett & Co., same place. No. 1,958,309.

Gravel-washing machine. Edehill T. Burnside, Shelbyville, Ind. No. 1,949,354.

Miscellaneous

Bucket-cleaner. Hilbert E. Swanson, Muskegon, Mich., assignor to Austin Machinery Corp. No. 1,956,734.

FOREIGN

Material-Handling

Movable automatic-feed conveyor. Societe de Constructions d'Elevateurs —Transporteurs Engreneurs. French 744,658.

Trap opening for chutes, conveyors, etc. M. Lavandier. French 744,682.

Jigging conveyors. T. G. Nyborg and H. C. Jenkins. British 390,204.

Belt-conveyor carriers. Dodge Mfg. Co., Ltd., and J. R. Kennedy. British 391,046.

Supporting rollers for conveyor belts. W. Hepburn. British 391,055.

Conveyor rollers. Fisher & Ludlow, Inc., and N. B. Ludlow. British 391,538.

Feeding devices for powdered or granular material. H. G. C. Fairweather (Fuller Co.). British 392,007.

Mining and Quarrying

Releasing-device for attachment to existing pit props. F. Richards. British 390,027.

Jointing and reinforcing steel arches and props for use in mines. F. Richards. British 390,959.

Steel arches for supporting roofs and sides in mines. F. Richards. British 391,599.

Washing

Washing dredged material; magnetic separators. F. Krupp Grusonwerk Akt.-Ges., Magdeburg-Buckau, Germany, and others. British 392,809.

Washing granular materials. W. W. Triggs, London (Dorr Co., Inc., New York). British 395,412.

Saving Through Safety

National Safety Council Surveys 1933 Accidents

CONTINUED improvement in the accident experience of the cement, mining and quarrying industries is reflected in the National Safety Council's survey of their accident experience in 1933. Data from this survey, which include the experience of previous years, are supplied by the Portland Cement Assn., and those mines and quarries in the National Safety Competition conducted by the U. S. Bureau of Mines whose records were available at the time the Council's analysis was prepared. The data, however, for each of these industries are preliminary.

In making the survey certain definitions of injuries and rates are set. *Disabling injury* is the term applied to any injury arising out of and in the course of employment that results in death, permanent total disability, permanent partial disability, or temporary disability. *Temporary disability* includes only cases where time is lost on other than the day or shift in which the injury occurred. *Injury-frequency rate* is the number of disabling injuries per 1,000,000 man-hr. of exposure. *Injury-severity rate* is the number of days lost as the result of disabling injuries, per 1,000 man-hr. of exposure. This rate includes arbitrary charges for permanent disabilities or deaths, in accordance with the standard scale.

Cement Industry. — Accidental injury rates in the cement industry reached new low levels during 1933. The improvement since 1926 in the injury experience of the quarry industry continued during 1933.

In the cement industry the improvement over 1932, however, was small, being only 1 per cent. for frequency and 9 per cent. for severity, on the basis of records from 102 companies reporting for both years. The 1933 record for all mills whose figures are now available averaged 4.79 for frequency and 2.39 for severity.

The experience of the cement industry with various types of injuries differed sharply during 1933. The frequency of fatalities was the lowest since 1926 but permanent partial disabilities, next in importance, reached a peak for the seven years in both frequency and severity. There was improvement, however, in the frequency and severity of temporary disabilities, which together with the fewer deaths accounts for the favorable changes in the total rate.

The 1933 injury rates give the cement industry a rank of 2d in frequency and 26th in severity in a list of 30 major industrial classifications. The tobacco industry holds first place in frequency with a rate of 1.43.

The 1932-1933 changes in the experience of cement mills were, on the whole, more favorable than variations in other industries. All industries increased frequency 7 per cent. from 1932 to 1933, but reduced severity 6 per cent., due to better experience with fatalities. Some industries did much better; public utilities had reductions of 7 per cent. in frequency and 17 per cent. in severity, marine decreased 12 per cent. and 6 per cent. and foundries 6 per cent. and 44 per cent., respectively.

The poor standing of the cement industry in severity, in comparison with other industrial groups, is due largely to high severity rates in large mills. Severity rates in large mills average 3.03 against 1.91 for middle-sized mills and 0.63 for small units. In frequency the reverse is the case; the rates range upward from 4.03 in large units to 6.98 in small units.

Relative Importance of Different Types of Accidents in All Industries and in Mining and Quarrying

Type of Accident	All Industries (*per cent.*)	Mining and Quarrying (*per cent.*)
All types	100.0	100.0
Handling objects	25.9	17.6
Falls to different level	8.7	2.5
Falls to same level	9.5	5.7
Machinery	12.0	5.8
Vehicle	10.9	18.9
Using hand tools	7.6	8.8
Falling objects	8.7	29.6
Stepping on or striking against objects	5.6	4.1
Electricity, explosives, heat	3.6	2.7
Harmful substances	2.1	0.4
Others	5.4	3.9

Rate increases from 1932 to 1933 were largest in small units; frequency rose 70 per cent. and severity was up 17 per cent. Large units made the best reduction in frequency, 16 per cent., but severity rose 44 per cent.; middle-sized units had the best results, reducing frequency 4 per cent. and severity 45 per cent. All plants, however, need to watch their records very carefully when operations are expanding, because some industries, such as steel and automobiles, with sharp increases in working time over 1932, had worse records than industries showing only slight changes in working time.

Mining Industries. — Preliminary figures for each general type of mining show that nonmetal mines had the best 1933 records, averaging 23.40 for frequency and 0.97 for severity. Metal mines had the next lowest frequency rate but their severity rate of 8.41 is above the average for bituminous coal mines and compares with 11.49 for anthracite mines which also have the highest frequency rate, 107.66.

The accompanying table gives a percentage distribution, by type of accident, of the cases (nearly all compensable) covered in recent 1-yr. reports from Illinois, New York, Maryland, New Jersey and Pennsylvania. These reports cover 224,661 injuries in all industries and 26,557 injuries in mining and quarrying.

Falling objects was the most frequently reported type of accident among mine and quarry employees; 29.6 per cent. of all cases were in this classification, nearly four times the average percentage for all industries. Vehicular accidents ranked second, and handling objects, third. Machinery accidents were relatively low, as were also the falls-of-persons classification.

In the quarrying industry in 1933, there were decreases over 1932 of 8 per cent. in injury frequency and 6 per cent in severity and these reductions, as shown in the report, brought rates down to new low levels. The entire industry averaged 16.42 for frequency and 6.68 for severity on the basis of records from 121 organizations which worked over 9,000,000 man-hr. during 1933.

The quarry industry, like mining, is one of the few industries to show improvement in both injury rates during 1933. All industries had 7 per cent. higher frequency rates than 1932 and while there was a reduction of 6 per cent. in severity, due to fewer fatalities, the frequency and severity of permanent partial and temporary disabilities increased.

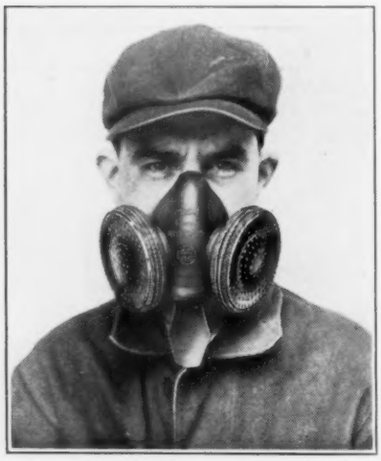
Injury rates in the quarry industry, however, are far above average, as shown by standings of 19th in frequency and 29th in severity in a list of 30 major industries. All industries averaged 14.58 in comparison with 16.42 for quarries; in severity, corresponding rates are 1.59 and 6.68. The high severity for quarries compares with 5.76 for construction companies and 5.00 for lumbering industry.

At the annual meeting of the Ohio Concrete Products Assn. the following officers were elected: Al C. Dale, Columbus, president; E. P. Weese, Youngstown, vice-president; and G. M. Friel, Columbus, secretary-treasurer.

New Machinery and Supplies

Simplified Respirator Has Increased Filter Capacity

The Mine Safety Appliances Co., Pittsburgh, Pa., announces a new, patented development in dust-respiratory equipment, the MSA Comfo-Respirator, which recently completed its final tests in the company's research laboratories.



New type of respirator said to combine lightness with efficiency.

Unique in design, and extremely comfortable to wear, the Comfo-Respirator features the use of greatly increased filter capacity and a special filter material to secure new low breathing resistance and high efficiency against fine dust, without sacrificing lightness.

In the development of the new respirator, and throughout the tests, special effort has been made to combine greater dust stoppage with simplicity of construction, comfort and working freedom, in order to overcome the characteristic objection of workmen to the wearing of dust-respiratory equipment.

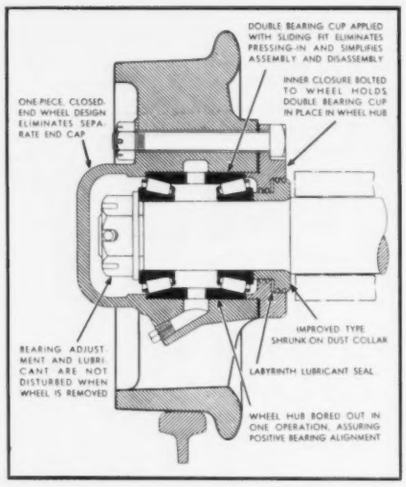
Double-Cup Bearing Is Used in New Mine Car Mounting

The Timken Roller Bearing Co., Canton, Ohio, announces a new type of bearing mounting for mine car service. The new mounting uses a double-cup bearing, instead of two single cups. The shrunk-in-place steel dust collar which is a feature of Timken mine car bearing mountings has been retained, but modified so that it provides a labyrinth seal in conjunction with the inner closure. This is said to eliminate the possibility of loss of lubricant or entrance of grit and water.

Outer sealing is insured in the new design by the elimination of separate end caps on the wheels, the unit being cast in one piece, thus effectively preventing loss of lubricant in service or the entrance of foreign matter into the bearing. To remove the new type wheel, all that is required is the loosening of three bolts which clamp the inner closure and wheel in place.

In the new mounting the wheel hub is bored out in a single operation to insure correct bearing alignment. When wheel replacement is necessary, or when it is desired to inspect the bearings the wheel may be slipped off easily without disturbing the bearing adjustment. The bearing remains on the axle as a complete unit, the hub being machined for a slip fit over the bearing cup.

While the new bearing offers many new


DOUBLE BEARING CUP APPLIED WITH SLIDING FIT ELIMINATES PRESSING-IN AND SIMPLIFIES ASSEMBLY AND DISASSEMBLY
ONE-PIECE, CLOSED-END WHEEL DESIGN ELIMINATES SEPARATE END CAP
INNER CLOSURE BOLTED TO WHEEL HOLDS DOUBLE BEARING CUP IN PLACE IN WHEEL HUB
IMPROVED TYPE SHRUNK-ON DUST COLLAR
BEARING ADJUSTMENT AND LUBRICANT ARE NOT DISTURBED WHEN WHEEL IS REMOVED
LABYRINTH LUBRICANT SEAL
WHEEL HUB BORED OUT IN ONE OPERATION, ASSURING POSITIVE BEARING ALIGNMENT

New type of double-cup mine-car roller bearing.

features, the fundamental advantages of the present mine car application are said to be retained. Both types of mounting provide for inspection and easy adjustment for wear. The bearings in both types distribute radial and thrust loads evenly. Both types are made from Timken special alloy steels and are designed to give long life under heavy loads and severe operating conditions. The new bearing mounting can be furnished in the closed-end wheel, stub and extended-axle types.

Combined Truck and Trailer Has Removable Metal Tracks

The Euclid Road Machinery Co., Cleveland, O., announces the new Euclid bottom-dump Trac-Truk which consists of combined tractor and trailer units. This new machine is said to have a speed comparable to motor trucks and the carrying capacity of a crawler tractor wagon. It is said that six cu.yd. of dirt can be hauled at speeds up to 15 m.p.h. Another feature is the short turning radius of 13 feet. The large pneumatic tires on both the tractor and trailer are said to provide ample traction for ordinary ground conditions. For extreme conditions metal tire tracks are supplied which are readily removable.

The tractor is powered with a 100-hp. engine of well-known make through a standard type of heavy duty transmission. A heavy-duty truck type of steering mechanism is supplemented for extra short turning by foot-operated steering brakes. A guard plate protects the front axle, engine transmission, drive shaft and rear axle. The weight of the wagon is equally divided between the two tractor driving wheels and the two trailer wheels. The wagon is dumped by a single jerk on the door trip lever and the doors are automatically closed by a single jerk on the clutch lever of the mechanical wind.

Fireless Steam Locomotive Requires Infrequent Charging

The Heisler Locomotive Works, Erie, Pa., has developed a fireless locomotive which is a steam locomotive without boiler or firebox. In place of a boiler the engine has a tank of welded construction with a capacity of about three times that of an ordinary locomotive boiler. This tank,

Steam locomotive without boiler or firebox.

which is heavily lagged and jacketed to prevent loss of heat, is filled with water to about four-fifths of capacity. Then, by a steam pipe run from a stationary boiler to a point below the level of the water in the tank, the water is heated until the pressure and temperature in the locomotive tank are the same as in the stationary boiler from which the charge is being taken. It is from this heat stored in the water that the locomotive gets its power.

The energy stored in the locomotive

Combined tractor and trailer unit which combines speed and carrying capacity.

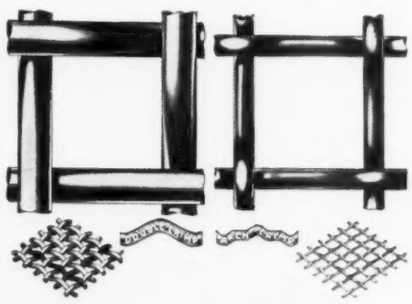
tank in the form of heat is transmitted to the rail in the form of tractive force through the expansion of steam in the large low-pressure cylinders of the locomotive. After charging there is steam in the space above the water in the tank and as this steam is drawn off through the throttle in small quantities, and expanded in the low-pressure cylinders as the locomotive works, the pressure and temperature of the steam remaining above the water in the tank are reduced. During this reduction part of the water is turned into more steam, and this process continues until atmospheric pressure is reached and the temperature is 212 deg. F.

The engine can be charged from any stationary boiler which carries a pressure of 100 lbs. or more. It is said that one charge may last from two to ten hours under normal conditions of service, depending upon the amount of work required of the locomotive. The time required for charging a Fireless locomotive depends upon the pressure and horse power of the boiler from which it is being supplied, as well as the size of the locomotive. From 10 to 30 minutes for a full charge is said to be the usual time required. Where the stationary boiler carries superheated steam, charging time is considerably reduced.

The water initially put in the locomotive tank never needs replacing, as the steam condensed in charging continually raises the water level. In fact, the engine has to be blown down occasionally to reduce the water to the proper level.

Special Method of Crimping Decreases Wire Cloth Wear

The Ludlow-Saylor Wire Co., St. Louis, Mo., has perfected an alloy for heavy-duty wire screens and wire cloth for use where severe service is required of vibrating screen sections and revolving screen cylinders. In addition to great hardness and toughness the Super-Loy wires are said to possess a resilience which adds to their wear-resisting properties. A special



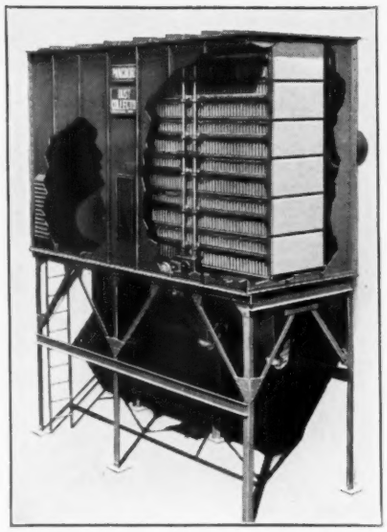
Alloy wire screen cloth with two methods of crimping.

method of crimping and fabrication is said to eliminate wear between the wires by allowing an increase in the interlocking pressures used to grip the wires together at their intersections.

All-Metal Cloth Screen Dust Collector Has Many Features

The Pangborn Corp., Hagerstown, Md., has developed the new Type CH all-metal, cloth screen dust collector for which many outstanding features are claimed. These are made in a wide range of sizes. The collector casing is made of heavy sheet steel panels supported by and bolted to a structural frame. It is dust and weather tight and has man doors for access to both dust and clear air sides. Hoppers are of heavy sheet steel with riveted packed joints.

The galvanized steel, wire-mesh, non-collapsible screen frames are non-static because they are electrically grounded. The screen beater rod is built integral with the screen. The specially-woven filter cloth



All-metal cloth-screen dust collector with interior construction shown.

is said to combine balanced physical strength and high resistance to abrasion with no sacrifice of filtering value and with minimum resistance to air flow. Hoppers are provided with air and dust-tight cutoff-type valves which are sealed with adjustable rubber gaskets. Mechanically driven rotary valves are also available.

Among the features claimed are that all moving parts are on the clean side, eliminating wear, and the convenience of both dust and clean sides for inspection. The screens are of convenient size and weight, easily handled by one man, and any individual screen can be easily and quickly removed without disturbing adjacent screens, rapping device or casing sheets.

Standard Bronze Gate Valve Designed for High Pressure

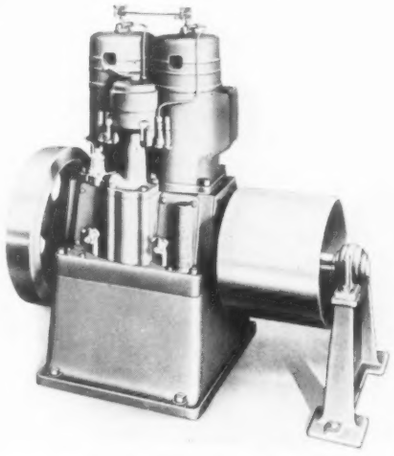
The Kennedy Valve Manufacturing Co., Elmira, N. Y., has placed on the market a new heavy standard bronze gate valve designed for 150 lb. working steam pressure and 250 lb. working water, oil or gas pressure. This valve, known as Fig. 23, has all the special features of design which were recently incorporated in the Kennedy Fig. 27 standard bronze gate valve but is heavier throughout to withstand the higher working pressures for which it is intended.

One of the outstanding features of these new valves is the large bonnet hex which is placed close to the body to make the entire valve more rigid and also to assist easier removal of the bonnet and stem assembly when the valve is installed with close clearances. Another important feature is the design of the stem which is made of specially tough bronze, has an unusually large number of heavy contact threads, and has a flexible connection between the stem head and the disc, making stripping of threads almost impossible and thereby prolonging the life of the valve.

Additional features are the deep stuffing box with specially-selected high-graphite molded packing rings, bronze gland and heavy packing nut, the substantial non-heating, non-slipping handwheel, and the heavy pipe and hexes. These valves are built in a complete range of sizes up to 3 in.

Light-Weight Oil Engines Range From 25 to 100 Hp.

The Bolinder's Co., Inc., New York, N. Y., announces the Type W7 light-weight oil engine which is made in sizes ranging from 1-cyl., 25 b. hp., to 4-cyl., 100 b. hp. These engines are available as stationary engines with pulley or extended shaft drives, stationary motor units driving generators mounted on the same base, and marine engines fitted with enclosed reverse gear. These engines operate on the 2-stroke principle. The bedplate on which the engine is mounted is of cast iron with the air silencer formed in it. Roller-type main bearings are used, the crank pin bearing is of bronze, white metal lined, and the gudgeon pin bearing is a needle roller bearing requiring very little lubricating oil. The crankcase is in one piece with doors which give access to the



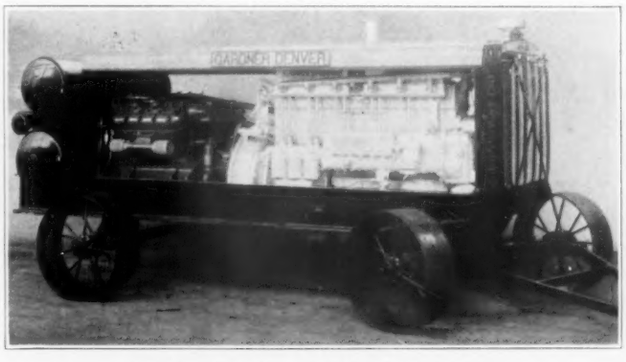
Two-stroke light-weight oil engine.

crankpin bearings. Circulating water pumps are provided and the governor and fuel pumps are combined in a pillar bolted to the crankcase and gear driven from the engine. The crankshaft is counter-weighted and the connecting rod of special forged steel is of the I-section type. Starting is by air and standard equipment includes a water-cooled silencer.

Portable Air Compressor Has Caterpillar Diesel Engine

The Gardner-Denver Co., Quincy, Ill., announces a new line of portable compressors. These units are powered with the Caterpillar Diesel engine and are said to show considerable saving in fuel cost over similar units operated by gasoline engines.

The D-11000 Caterpillar engine develops 104 hp. at 870 r.p.m. with a piston displacement of 1039 cu.in. The unit has a wheelbase of 170 in. and weighs 12,625 lb. fully equipped.



Diesel-engine driven portable air compressor.

Classified Buyers' Guide

A Directory of PIT AND QUARRY Advertisers Arranged According to Product

Although every effort is made to insure accuracy and completeness in these listings, the publisher cannot accept responsibility for errors or omissions. Any mistakes discovered will gladly be rectified, if brought to the attention of the Advertisers' Service Department.

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*Jeffrey Mfg. Co.
*Link-Belt Co.
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Sprout, Waldron & Co.

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*Jeffrey Mfg. Co.
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*Gruendler Crusher & Pulv. Co.
*Jeffrey Mfg. Co.
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*Universal Crusher Co.

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Dragline Excavators
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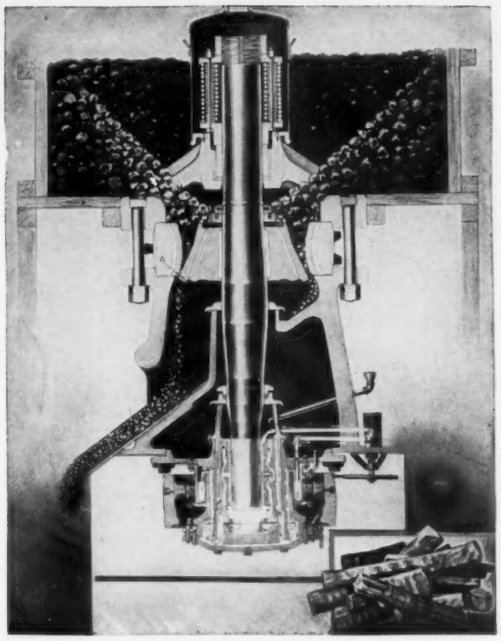
Mott Core Drilling Co.
Pennsylvania Drilling Co.

Drills, Diamond
Mott Core Drilling Co.
Pennsylvania Drilling Co.

*** See also information in the 1934 Pit and Quarry HANDBOOK.**



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Guaranteed!

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The Savings Effected with this crusher are astounding:

In cost of Maintenance.....80%
In Power.....The entire cost of crusher and motor in pulley is amortized annually.

Sieving test on glacial gravel crushed at the rate of 18 tons per hour, with No. 19 crusher set to ⅛ in., and using less than 15 hp., follows:

Minus ⅜ in.	100%
Plus 3 mesh	21½%
Minus 3—Plus 4	17%
Minus 4—Plus 14	36½%
Minus 14—Plus 48	15%
Minus 48—Plus 100	4%
Minus 100	5½%

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SIMSBURY, CONNECTICUT

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Classified Buyers' Guide

A Directory of PIT AND QUARRY Advertisers Arranged According to Product

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*General Electric Co.

Hoists
*Bartlett & Snow Co., C. O.
Hetherington & Berner, Inc.
*Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Smith Engr. Works
Sprout, Waldron & Co.

Hoppers
*Hendrick Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.

Hose (Air, Steam and Water)
Goodyear Tire & Rubber Co.
Worthington Pump & Mchy. Corp.

Hose Couplings (See Couplings)

Hydraulic Guns (See Guns—Hydraulic)

Idlers
Barber-Greene Co.
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.

Kilns and Coolers (Rotary)
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Lights (Flood)
*General Electric Co.

Lime-Handling Equipment
*Bartlett & Snow Co., C. O.
Fuller Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

Lime Kilns
*Bartlett & Snow Co., C. O.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Linings (Ball- and Tube-Mill) (See Mill Liners and Linings)

Loaders and Unloaders
Barber-Greene Co.
*Bartlett & Snow Co., C. O.
Fuller Co.
Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.

Locomotive (Diesel)
*Fate-Root-Heath Co.
*Plymouth Locomotive Works

Locomotives (Diesel-Electric)
*Fate-Root-Heath Co.
*General Electric Co.
*Plymouth Locomotive Works

Locomotives (Electric, Gas and Steam)
*Fate-Root-Heath Co.
*General Electric Co.
*Lima Locomotive Works
*Plymouth Locomotive Works

Locomotives (Gas-Electric)
*Fate-Root-Heath Co.
*General Electric Co.
*Plymouth Locomotive Works

Locomotives (Oil-Electric)
*Fate-Root-Heath Co.
*General Electric Co.
*Plymouth Locomotive Works

Locomotives (Storage Battery)
*General Electric Co.

Locomotives (Trolley-Battery)
*General Electric Co.
*Jeffrey Mfg. Co.

Magnetic Pulleys (See Pulleys, Magnetic)

Manganese Steel
Manganese Steel Forge Co.
Pettibone Mulliken Co.

Manganese Steel (Plates and Sheets)
Manganese Steel Forge Co.
Pettibone Mulliken Co.

Measuring Devices (Electric)
*General Electric Co.

Mill Liners and Linings
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Mills (Grinding) (See also Crushers—Hammer)
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Fdy. & Mch. Co.
Sprout, Waldron & Co.

Motor Trucks
General Motors Truck Co.

Motors and Generators
*Allis-Chalmers Mfg. Co.
*General Electric Co.

Motors (Internal-Combustion) (See Engines — Internal-Combustion)

Nails
*American Steel & Wire Co.

Netting (Locomotive Stack)
Buffalo Wire Works Co.

Nozzles (Gravel Washing)
Binks Mfg. Co.
*Deister Concentrator Co.

Nozzles (Hydraulic) (See Guns—Hydraulic)

Nozzles (Spray)
Binks Mfg. Co.
*Deister Concentrator Co.

Packings
Goodyear Tire and Rubber Co.

Partitions (Wire)
Buffalo Wire Works Co.
National Wire Cloth Co.

Perforated Metal Plates
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Chicago Perforating Co.
*Hendrick Mfg. Co.
Morrow Mfg. Co.
Sprout, Waldron & Co.

Pipe Flanges
Hetherington & Berner, Inc.

Plug Valves (See Valves)

Pneumatic Drills (See Drills, Rock)

Portable Conveyors
Barber-Greene Co.
Fuller Co.
Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.

Portable Crushing and Screening Plants
Barber-Greene Co.
*Bartlett & Snow Co., C. O.
Diamond Iron Works
Good Roads Machy. Corp.
*Jeffrey Mfg. Co.
*Universal Crusher Co.

Portable Engines (See Engines—Internal Combustion)

Portable Loaders (See Loaders and Unloaders)

Power Cables (Rubber Clad)
*American Steel & Wire Co.

Power Shovels (See Shovels, Electric, Internal-Combustion and Steam)

Pulleys (Magnetic)
Sprout, Waldron & Co.

Pulleys (Wing)
Sprout, Waldron & Co.

Pulverized Fuel Systems
*Bartlett & Snow Co., C. O.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Pulverizers (See also Crushers; Mills; etc.)
*Bartlett & Snow Co., C. O.
*Gruendler Crusher & Pulv. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Universal Crusher Co.

Pump Valves (See Valves Pump)

Pumps (Air Lift)
Fuller Co.

Pumps (Bulk Cement)
Fuller Co.

Pumps (Cement Slurry)
Allen-Sherman-Hoff Co.
*Morris Machine Works

Pumps (Centrifugal)
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
Erie Pump & Engine Works
Hetherington & Berner, Inc.
Kansas City Hay Press Co.
*Morris Machine Works
Pettibone Mulliken Co.
Worthington Pump & Mchy. Corp.

Pumps (Dredging)
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
Erie Pump & Engine Works
Hetherington & Berner, Inc.
*Morris Machine Works
Pettibone Mulliken Co.
Worthington Pump & Mchy. Corp.

Pumps (Sand and Gravel)
Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
Erie Pump & Engine Works
Hetherington & Berner, Inc.
Kansas City Hay Press Co.
*Morris Machine Works
Pettibone Mulliken Co.

Pumps (Vacuum)
Fuller Co.

Ready-Mixed Concrete Plants
*Bartlett & Snow Co., C. O.

*** See also information in the 1934 Pit and Quarry HANDBOOK.**

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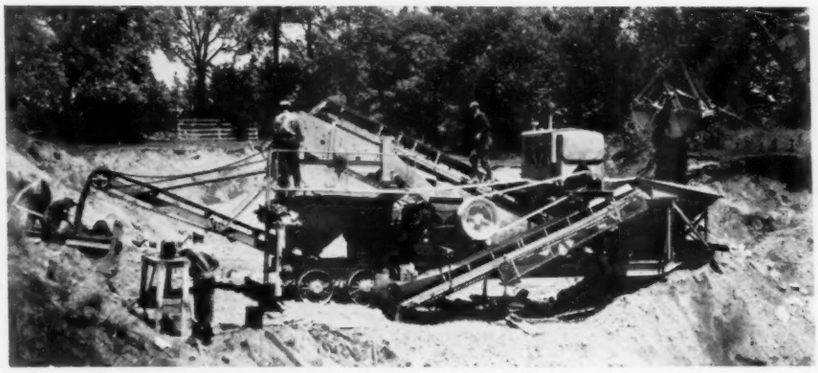

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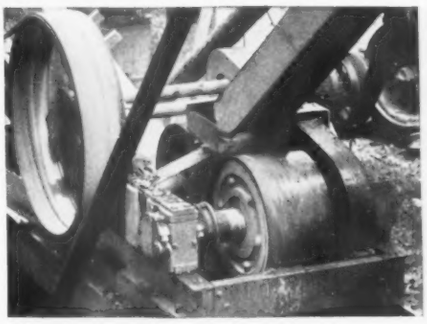

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Classified Buyers' Guide

A Directory of PIT AND QUARRY Advertisers Arranged According to Product

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Recuperators
Catlin, A. W.
Manitowoc Engr. Works

Respirators
Pulmosan Safety Equipment Corp.

Rheostats
*General Electric Co.

Rock Drills (See Drills—Rock)

Rod Mills
*Kennedy-Van Saun Mfg. and Eng. Corp.

Rope (Wire) (See Wire Rope)

Safety Equipment
Pulmosan Safety Equipment Corp.

Sand Separators
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Smith Engr. Works

Sand-Settling Tanks
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Smith Engr. Works

Scrapers (Power Drag)
*Link-Belt Co.

Screens
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Buffalo Wire Works Co.
Chicago Perforating Co.
*Deister Concentrator Co.
Deister Machine Co.
Diamond Iron Works
*Eagle Iron Works
*Gruendler Crusher & Pulv. Co.
Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
Ludlow-Saylor Wire Co.
McLanahan and Stone Corp.
Manganese Steel Forge Co.
Morrow Mfg. Co.
National Wire Cloth Co.
Productive Equip. Corp.
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.
Tyler Co., W. S.
*Universal Crusher Co.

Screens (Vibrating or Shaking)
*Allis-Chalmers Mfg. Co.
Barber-Greene Co.
*Bartlett & Snow Co., C. O.
Buffalo Wire Works Co.
*Deister Concentrator Co.
Deister Machine Co.
Diamond Iron Works
*Gruendler Crusher & Pulv. Co.
*Jeffrey Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Productive Equip. Corp.
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.
Tyler Co., W. S.
*Universal Crusher Co.

Separators (Air) (See Air Separators)

Sheaves
*Allis-Chalmers Mfg. Co.
*Eagle Iron Works
*Gruendler Crusher & Pulv. Co.
Haiss Mfg. Co., Geo.
Hetherington & Berner, Inc.
*Jeffrey Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Pettibone Mulliken Co.
Sprout, Waldron & Co.

Shovels (Electric, Internal Combustion and Steam)
*Link-Belt Co.
Manitowoc Engr. Works
Ohio Power Shovel Co.

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*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Hetherington & Berner, Inc.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

Speed Reduction Units
*General Electric Co.
*Link-Belt Co.

Spouts (See Chutes and Chute Liners)

Sprays
Binks Mfg. Co.
*Deister Concentrator Co.

Sprays (Paint)
Binks Mfg. Co.

Sprockets and Chain
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Pettibone Mulliken Co.
Sprout, Waldron & Co.

Stackers
*Jeffrey Mfg. Co.

Starters (Automatic, Motor)
*General Electric Co.

Steel (Alloy)
Manganese Steel Forge Co.

Steel Grating (See Grating, Steel)

Steel Inclines (See Inclines, Steel)

Steel Plate Construction
*Hendrick Mfg. Co.
Hetherington & Berner, Inc.
Manganese Steel Forge Co.
Sprout, Waldron & Co.

Storage Equipment
*Bartlett & Snow Co., C. O.
Haiss Mfg. Co., Geo.
*Jeffrey Mfg. Co.
*Link-Belt Co.

Sweeping Systems
Allen-Sherman-Hoff Co.

Switchboards (Electric)
*General Electric Co.

Switches (Electric)
*General Electric Co.

Tanks
*Bartlett & Snow Co., C. O.
*Hendrick Mfg. Co.
*Link-Belt Co.

Tanks (Sand-Settling)
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Morrow Mfg. Co.
Smith Engr. Works

Tires (Truck)
Goodyear Tire & Rubber Co.

Tools (Drill) (See Drilling Accessories)

Truck Equipment
Pettibone Mulliken Co.

Tractors
*Allis-Chalmers Mfg. Co.
*Fate-Root-Heath Co.
*Plymouth Locomotive Works

Trailers
General Motors Truck Co.

Tramways (Aerial)
*American Steel & Wire Co.

Transformers
*Allis-Chalmers Mfg. Co.
*General Electric Co.

Transmission Belting (See Belting)

Transmission Machinery
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
*Gruendler Crusher & Pulv. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.

Trippers
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

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Truck Mixers
*Bartlett & Snow Co., C. O.

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Underground Loaders
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.

Unloaders (Box Car)
Barber-Greene Co.
*Bartlett & Snow Co., C. O.
Fuller Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.

Unit Heaters
*General Electric Co.

Valves (Air)
Worthington Pump & Mchy. Corp.

Variable Speed Reducers or Transmissions
*Link-Belt Co.

Vibrating Screen Plate
*Bartlett & Snow Co., C. O.
Chicago Perforating Co.
*Hendrick Mfg. Co.
*Jeffrey Mfg. Co.
*Link-Belt Co.
Manganese Steel Forge Co.
Morrow Mfg. Co.

Vibrating Screens (See Screens—Vibrating)

Washers (Sand, Gravel and Stone)
*Allis-Chalmers Mfg. Co.
*Bartlett & Snow Co., C. O.
Diamond Iron Works
*Eagle Iron Works
Haiss Mfg. Co., Geo.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
McLanahan and Stone Corp.
Smith Engr. Works
Tyler Co., W. S.
Universal Road Machy. Co.

Welding and Cutting Equipment
*General Electric Co.

Welding Supplies
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*General Electric Co.
Manganese Steel Forge Co.

Well Drills (See Drills—Well)

Wheels (Car)
*Eagle Iron Works
Iowa Mfg. Co.
Pettibone Mulliken Co.

Winches and Capstans
*Bartlett & Snow Co., C. O.
*Jeffrey Mfg. Co.
*Link-Belt Co.
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Ludlow-Saylor Co.
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Tyler Co., W. S.

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Buffalo Wire Works Co.
Hazard Wire Rope Co.
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Buffalo Wire Works Co.
Hazard Wire Rope Co.
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Wire Rope Slings
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American Manganese Steel Co.
*American Steel & Wire Co.
Manganese Steel Forge Co.

Worm Gears (See Gears and Pinions)

*** See also information in the 1934 Pit and Quarry HANDBOOK.**

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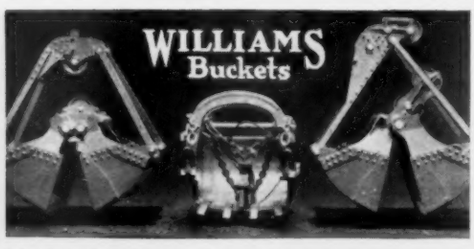

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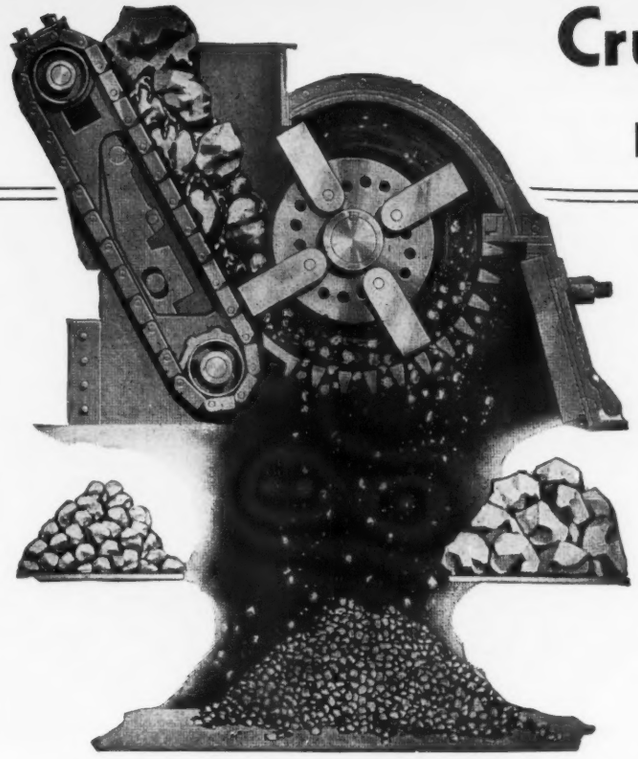

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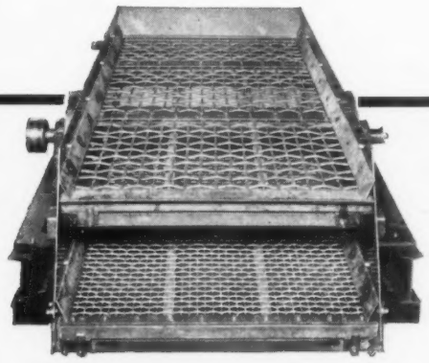

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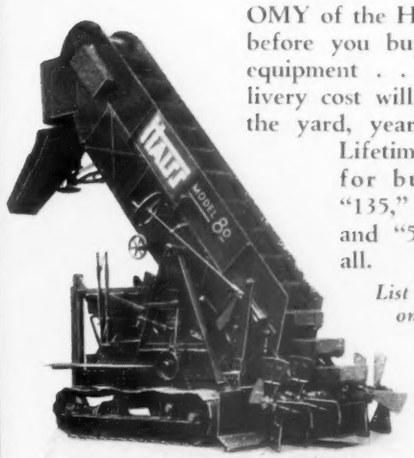

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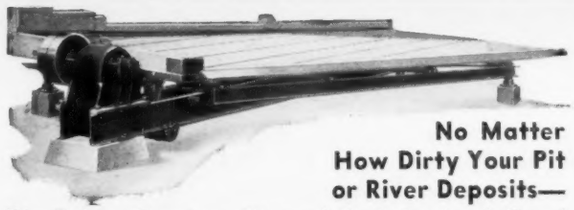

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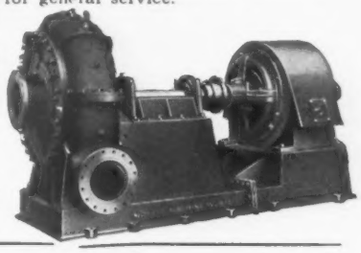

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From Crushers to Bin Gates

Write today for Bulletin 266

Smith Engineering Works, 504 E. Capitol Drive, Milwaukee, Wis.

TELSMITH

Lewistown Foundry Products

ARE

Performance-Tested

BUCKET ELEVATORS

REVOLVING SCREENS

CRUSHERS DRY PANS

Lewistown Foundry & Machine Co.

Lewistown, Pa.

LIMA

SHOVELS-CRANES-CLAMSHELLS-DRAGLINES

3-4 yd., 1 yd., 1 1-4 yd., 1 1-2 yd., & 1 3-4 yd.

(A TYPE AND SIZE FOR EVERY JOB)

The Ohio Power Shovel Company

Division Lima Locomotive Works, Incorporated

Lima, Ohio, U. S. A.

LIMA

HYDROSEAL DREDGE PUMP

Unique principle of hydrosealing both sides of the impeller against abrasive wear, cuts maintenance to a fraction and saves ⅓ in power costs in pumping sand, gravel, rock and other abrasive materials—Estimated economies guaranteed. Sizes 2" to 22", pulley or motor drive. Descriptive Catalog sent on request.

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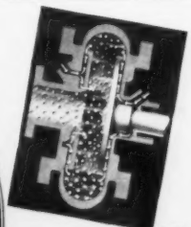
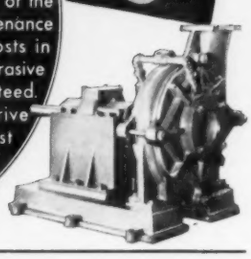
223 South Fifteenth Street

Philadelphia, Pa.

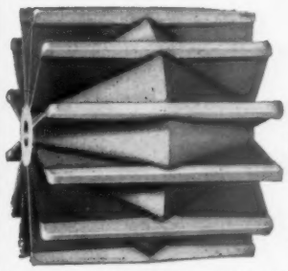




SAVE YOUR CONVEYOR

and

Elevator Belts *with* SPROUT-WALDRON Wing Pulleys



Interchangeable with standard pulleys. Nothing can lodge between belt and pulley.

SPROUT, WALDRON & CO. INC.

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Elevating, Conveying and Transmission Equipment

CRUSHERS
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SKIP HOISTS
ELEVATORS
BELT CONVEYOR IDLERS
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SCREENS

● Seven styles, for wet and dry screening, including hexagonal and round, jacketed and not jacketed, wire cloth and perforated plate designs are included in our complete line. Sizes to meet your requirements. Full details on request.

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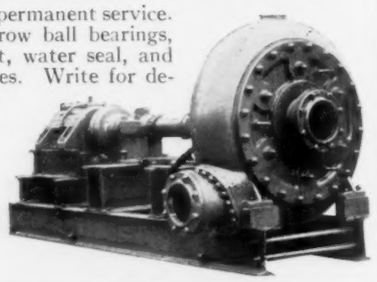
6194 HARVARD AVENUE • CLEVELAND, OHIO

The **Lightning**

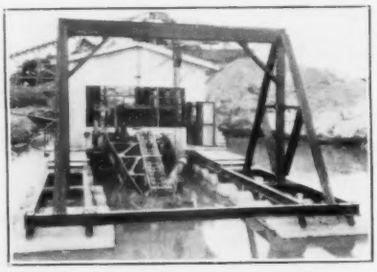
Extra HEAVY Pattern Sand Pump

For higher heads and permanent service. Extra heavy double row ball bearings, sleeve protected shaft, water seal, and other exclusive features. Write for details of this and other types of centrifugal pumps.



KANSAS CITY HAY PRESS CO.
Kansas City, Mo.

EAGLE SWINTEK SCREEN NOZZLE LADDER LOWER YOUR COST



Will eliminate stoppages and slug pumping—insuring an even, constant feed of solids to the suction nozzle—with less power—greatly decreasing the cost per yard of material produced.

Write for descriptive literature and let us tell you how this can be done with your dredge.

Eagle Iron Works
Des Moines, Iowa

Perforated Metals—Screens of All Kinds—For Sand, Gravel, Stone, Etc.

MATERIAL IN STOCK
PROMPT SHIPMENT

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538 South Clark St., Chicago, Ill.

Please send me catalogs and prices concerning the following items checked below:

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- ☐Agitators, Slurry
- ☐Air cleaners
- ☐Air compressors
- ☐Bag filling and weighing machinery
- ☐Bags, cloth
- ☐Bags, paper
- ☐Balls, steel
- ☐Barges, steel
- ☐Belt dressing
- ☐Belt fasteners
- ☐Belting, conveyor and elevator
- ☐Belting, transmission
- ☐Belt lacing
- ☐Belt plates
- ☐Belt rivets
- ☐Belt tighteners
- ☐Bin gates
- ☐Bins, concrete
- ☐Bins, steel
- ☐Blasting supplies
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- ☐Cableways, Slackline
- ☐Calcining Machinery
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- ☐Car Pullers and Movers
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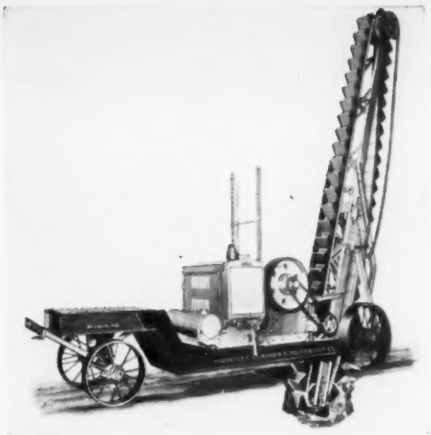

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New Balanced Portable Crushing Plant. Especially designed for Road Side Operation. Quarry, Gravel Pit Owners and Contractors are finding this new addition a real Profit Maker. Crusher, Power Units and Folding Elevator on 4-Wheel Steel Frame, Steel Jack Leg Bin and Screen, so as to give you combination crushing and screening either in gravel or stone operations.

Large or Small Jobs Handled easily by these units from 200 to 1,000 tons daily capacity.

Write GRUENDLER now

GRUENDLER CRUSHER & PULVERIZER COMPANY

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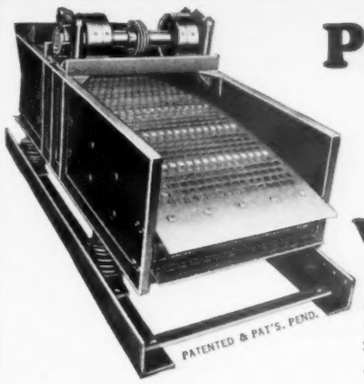

PLAT-O

Improved Heavy Duty

VIBRATING SCREEN

Built in all standard sizes and in from one to four decks.

Write for Descriptive Bulletin No. 22

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DEISTER COMPOUND FUNNEL CLASSIFIER

SOMETHING NEW FOR GRAVEL PLANTS

For hydraulic sizing of finer materials—5/16″ and down. Also for cleaning sand by elimination of silt, slime, vegetable matter and other light impurities.

Fully described in Bulletin No. 23

DEISTER MACHINE COMPANY

1933 EAST WAYNE STREET FT. WAYNE, IND.

ERIE

For Pumps with Long Life-- --Long Time Economy

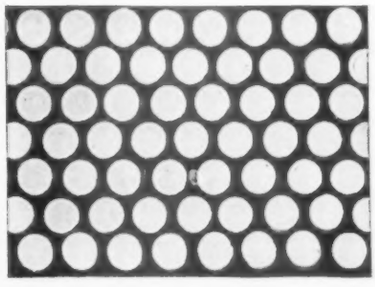
PUMPS

Write

ERIE PUMP & ENGINE WORKS

153 Glenwood Ave. Medina, N. Y.

MORROW SCREEN PLATES



MORROW PERFORATED METAL SCREEN PLATES for sizing and preparing coal, sand, gravel, stone and other bulk materials are made by a Company specializing in screening machinery.

A complete set of punches and dies covering a wide range of sizes, in round, square, oval and diagonal slots are ready for the press, insuring prompt delivery of orders.

The Morrow Manufacturing Co.
Wellston, Ohio

CONSOLIDATED

GOOD USED CRUSHING, QUARRY and CONTRACTOR'S EQUIPMENT FOR SALE

SEND US YOUR INQUIRIES FOR

Complete Crushing Plants; Diesel, Gasoline, Electric Cranes and Shovels; Hoists; Compressors; Pumps; Dragline and Excavating Equipment; and all sizes and types of Jaw, Gyratory and Roll Crushers; Swing Hammer Mills; Elevators; Belt Conveyors; Rotary and Vibrating Screens; Rotary Kilns and Dryers; Raymond and other fine Pulverizers; Air Separators; Hardinge Ball and Pebble Mills; Silex and iron lined Tube Mills, etc.

Send for Bulletin No. 15.

CONSOLIDATED PRODUCTS COMPANY, INC.

17-19 PARK ROW
NEW YORK CITY
Shops and Yards at
Newark, N. J., cover six acres

Tel. Barclay 7-0600
WE WILL BUY YOUR SURPLUS MACHINERY

We
- Sell
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- All Makes
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GREGORY HI-GRADE-REBUILT

- MOTORS
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- METERS, PUMPS
- HOISTS, etc.

Always Dependable
Economical

Money-Back Guarantee

GREGORY ELEC. CO.
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All 98% New
Immediate Shipment from Chicago Warehouse

¾ Yd. Sauerman Drag-Scraper Hoist, Belt type or will furnish direct driven by Gas or Diesel Eng. or Elect. Motor. Also ¾ Yd. Bucket.

Nos. 48, 42 & 36 American Ring Pulverizers.

75 KVA 80% PF 3 ph. 60 cy. 440 V. 1200 RPM Generator, direct connected Exciter, etc.

30" Allis-Chalmers Gyratory Crusher.

10x20 Climax Jaw Crusher mounted on Goose-Neck 4-Wheel Steel Trucks.

110 Cu. Ft. National Portable Compressor, New.

12x10 Ingersoll-Rand type ER-1 Compressor.

100 HP Thomas Dbl. Drum Elect. Hoist, A.C.

Ask for List No. 87—over 2000 items of Excellent Used and Surplus New Equipment.

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ELECTRIC DRAG SCRAPER HOIST

GOOD AS NEW

A. C. or D. C. OPERATION

Also a Large Stock of Used

Electric—Gasoline—Steam Hoists in Excellent Condition

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LIDGERWOOD MFG. COMPANY
ELIZABETH, NEW JERSEY

MOTORS— 3 PH., 60 CY.			ENGINE GENER.	
Hp.	Type	Speed	1–400 kva., Cr. Wh., 240 v., 3 ph., 60 cy., 120 r.p.m. to Hamilton Corliss Engine.	
800	G. E. sl. rg.	720		
600	G. E. syn.	860		
2–600	G. E. sl. rg.	252		
600	G. E. syn.	257		
600	Al. Ch. syn.	240		
3–675	Al. Ch. syn.	900		
400	West. sl. rg.	514		
400	Al. Ch. syn.	300		
300	Al. Ch. sl. rg.	585		
260	Al. Ch. syn.	720		
250	West. sl. rg.	720		
200	G. E. sl. rg.	1200		
200	West. sl. rg.	500		
200	F. M. sl. rg.	600		
150	G. E. sl. rg.	1750		
150	G. E. sq. c.	1750		
100	Cr. Wh. syn.	225		

MOTOR GENER.
1–750 kw. G. E. MPC., 250 v., D.C. Gener. to 1100 hp. G. E., ATI, synch. motor, 2200-3-60-900 r.p.m.

CENTRIF. PUMPS
3–14,000 G.P.M., 150' Head dir. conn., 675 hp. Al. Ch. 900 r.p.m. syn. motors.
1–14,000 G.P.M., 60' Hd., dir. conn. 260 hp., Al. Ch. 720 r.p.m.

Above are a few of our stock items.

BELYEA CO., INC.
153 W. 18TH ST., NEW YORK CITY
REBUILT GUARANTEED

SACRIFICE!!

Must Sell Immediately

Practically New

No. 7—20-TON AUSTIN HEAVY DUTY DRAGLINE CATERPILLAR CRANE

Exceptional machine for sand-pit, quarry or coal service.

Immediate delivery

Cash or Terms

Address Box 700, Pit and Quarry Publications, 538 S. Clark St., Chicago, Ill.

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QUARRY EQUIPMENT AND MACHINERY

Complete and Modern.
Electrically Operated.
Capacity 2,000 Tons Daily.
Will sell in whole or in separate items.
For detailed and complete, Inventory, Information and Prices, Address,

F. G. HAMBLEN, P. O. Box 572
Greenville, South Carolina

36" Conveyor Belt.
2000" 36', 7-ply Heavy Duty Belt.
24x24 Galena Double Rolls.
4x6 Niagara Double Deck Screen.
21-E Koehring Cat. Paver.
4½x6 Mundy Swinging Engine.
No. 34 and 50 Drill Sharpeners.
1300' Chgo. Pneu. OCE Elec. Compressor.
Calyx I.R. Class W.S. Core Drill.
60 HP. Firebox Boiler.
24x36 Traylor Jaw Crusher.
18x36 Traylor Jaw Crusher.
12" Centrifugal Pump.
Osgood 1-Yd. Crane and Shovel.

R. C. STANHOPE, INC.
875 Sixth Ave.,
New York, New York.

1—BYERS 1¼ yard Crane.
1—LORAIN 75 Shovel 1¼ yd.
1—1 yd. KOEHRING crane.
1—1 yd. P & H 600 Shovel.
2 and 3 yd. Electric draglines.
1—½ yard Gas dragline.
24" conveyors 75 and 170 ft.
4—4 yard Autocar trucks.
1—BROWNING Truckcrane.
2—30 CATERPILLAR Tractors with 5 yd. crawler wagons.
1—Perfect Classifier. 1—Shaw Classifier.
1—5x8 Vibrating Screen.
1—8 ton 36" gauge Locomotive.
Clamshell buckets ½ to 1¼ yd.
Crushers 10x18; 11x26; 18x30
Misc. Pumps for Gravel plant and Pipe.

J. T. WALSH
Brisbane Bldg. Buffalo, N. Y.

Crushed-Stone Plant FOR SALE

Includes steam shovels, dump cars, steam locomotives, trackage, primary and secondary crushers, screens, conveyors, elevators, electric motors, turbo-generator, machine shop and buildings. Capacity 1500 tons per day. Write Thurber Earthen Products Company, Fort Worth, Texas.

FOR SALE

Erie ¾ Yd. Steam Shovel on Cats.
8 Ton Plymouth Std. Ga. Gas Locomotive.
5 Ton 48" Ga. Plymouth Gas Locomotive.
19 Easton 4 Yd. End Dump 48" Ga. Quarry Cars.
5" High Pressure Pump.
30 & 60 Caterpillar Tractors.
19 K & J 16 Yd. Std. Ga. Air Dump Cars.
2 Late Type Jordan Air Operated Spreaders.
1 Std. Ga. Nordberg Track Shifter.
175 Bucyrus Shovel, 5 Yd. Dipper.
856' Sullivan Ang. Cpd. Air Compressor with 152 Hp. 220 V. A.C. Motor Belted.
Derricks, Boilers, Engines, Locomotives, Gravel Plants, Road Rollers, Forms, Finishers, Oil Engines, Motors.
TELL US WHAT YOU WANT TO BUY.

The T. J. Lane Company
Springfield, Ohio

DERRICK OUTFIT

1—15-ton Steel Stiff Leg Derrick, 80-ft. boom, 38-ft. mast—in A-1 condition.

LOCOMOTIVE CRANES

3—25-ton American 8-wheel cranes, 50-ft. boom; new in 1930.

CARS

12-yd. Western Air, also Hand Dump Cars, Flats, Gondolas, Steel Hopper Cars, Box Cars.

HYMAN-MICHAELS COMPANY

20 N. Wacker Dr. Bldg., Chicago, Ill.
Railway Exch. Bldg. St. Louis, Mo.
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For Sale

1—No. 7½ McCully Crusher.
1—No. 6 Smith Crusher.
1—No. 5 Austin Crusher.
1—10" Superior McCully Crusher.
1—8" Traylor Crusher.
2—No. 3 Gates Crushers.
1—6" Superior McCully Reduction Crusher.
1—48" Symons Horizontal Disc Crusher.
Several Jaw Crushers.
Gas and Electric Motors, 1 HP to 200 HP.
1—Clipper Well Drill.
1—Clyde 2 Drum Hoist, built for 2 Yd. Drag Scraper, with or without motor.
2—Complete Gravel Washing Plants.

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"E.C.A." REBUILT EQUIPMENT—IMMEDIATE SHIPMENT

AIR COMPRESSORS
Portable and stationary, belt, with elec. or gas, power, sizes from 21 cu.ft. to 1000 cu.ft.

BUCKETS
246—Buckets, all sizes and makes.

CARS
Large lot including std. ga. 6 and 12-yd. and 20-yd., 36-ga. 5 yd. and 24-ga. 1½-yd. Also std. ga. flat cars and ballast cars.
48—Koppel Quarry cars 42" ga. 2½ yd. One way side dump.

CONVEYORS and ELEVATORS
2000 ft. 36 in. 7 ply rubber covered conveyor belt.
9—Portable Belt Conveyors with steel frame, gas or electric power, 18 in. and 24 in. Barber Greene and Chicago Automatic.

CRANES (Locomotive)
5—Locomotive cranes; sta. ga. 30 and 25-tons; Ohio, Browning, American, Industrial.
1—American 15 ton gasoline powered locomotive crane on 8 wh. MCB trucks, 50 ft. boom.

CRANES and DRAGLINES
2—2-yd. Diesel draglines; 1—Link Belt Crawler, K-55, 70 ft. boom; 1—Page-Walker 65 ft. boom.

SPECIAL OFFER

CRUSHERS
1—20 in. Traylor Bulldog Gyratory crusher, SU No. 14277; size of each opening, 20 in. x 80 in.; weight 104,000 lbs.; cap. 250 tons per hour of 4" material, 110 tons per hour of 2½" material; used only short time.
1—Symons coarse cone crusher, size No. 5½, SU No. 521; capacity 450 tons per hour of 2½" material—130 tons per hour of ½" material; weight 85,000 lbs.
1—Set Power and Mining Machinery Co. crushing rolls, size 42 in. x 16 in., rated capacity 15-20 tons per hour of ⅝" material; weight 41,000 lbs.
1—No. 6 Champion jaw crusher, No. U-1075-4; jaw opening 12"x26"; capacity 24-35 tons per hour of 2" material; weight 20,000 lbs. Like new.
2—No. 3 McCulley gyratory crushers; size of each opening 7"x28"; capacity 25 tons per hour of 2¾" material; 11 tons per hour of 1¼" material; weight 17,000 lbs.

SCREENS
2—Allis Chalmers roller type, all steel, heavy duty, 48 in. dia. by 24 ft. long screen in 3 sections.
2—P & M Roller type, 48 in. by 18 ft. long.
1—Allis Chalmers, roller type 51" dia. by 21 ft. long.
1—Universal vibrating screen, 3 ft. wide by 8 ft. long.
1—Northwest Type M, Serial No. 2334, 60-ft. boom, 1½-yd. dragline or clamshell bucket.
6—1-yd. gasoline crawler type cranes, Northwest, Link Belt, P & H, Brownhoist.
3—½-yd. gasoline crawler cranes, Bucyrus Erie, Northwest and Brownhoist.

DERRICKS
Steel and wood, stiff leg, or guy; from 5 to 50 tons.

HOISTS
Gasoline, electric and steam. All sizes.

LOCOMOTIVES
32—Gasoline locomotives from 14-ton to 2-ton, std. 36 and 24-ga.
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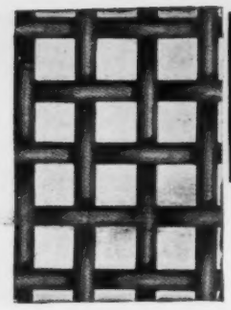

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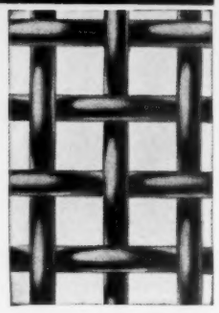

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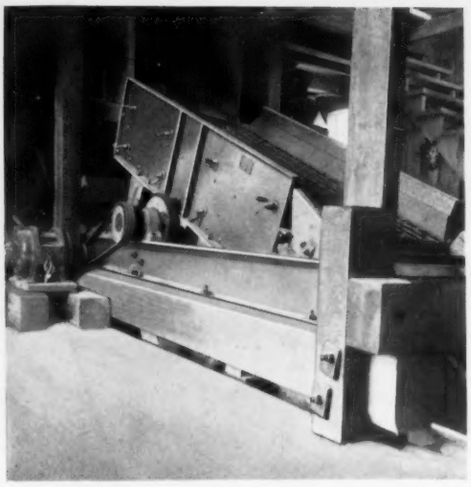

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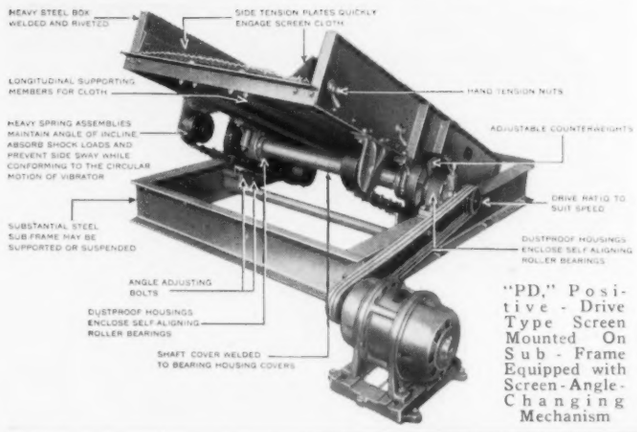
The "PD" type, positive drive screen illustrated, is designed for heavy-duty, large-capacity, coarse screening. Equipped with angle changing mechanism. Can be supported from below or hung by cables from above. Screen cloth is quickly and easily detached. Long cushioning springs take shock loads. Send for Catalog.


HEAVY STEEL BOX WELDED AND RIVETED
SIDE TENSION PLATES QUICKLY ENGAGE SCREEN CLOTH
LONGITUDINAL SUPPORTING MEMBERS FOR CLOTH
HAND TENSION NUTS
HEAVY SPRING ASSEMBLIES MAINTAIN ANGLE OF INCLINE, ABSORB SHOCK LOADS AND PREVENT SIDE SWAY WHILE CONFORMING TO THE CIRCULAR MOTION OF VIBRATOR
ADJUSTABLE COUNTERWEIGHTS
DRIVE RATIO TO SUIT SPEED
SUBSTANTIAL STEEL SUB FRAME MAY BE SUPPORTED OR SUSPENDED
DUSTPROOF HOUSINGS ENCLOSE SELF ALIGNING ROLLER BEARINGS
ANGLE ADJUSTING BOLTS
DUSTPROOF HOUSINGS ENCLOSE SELF ALIGNING ROLLER BEARINGS
SHAFT COVER WELDED TO BEARING HOUSING COVERS

"PD," Positive - Drive Type Screen Mounted On Sub - Frame Equipped with Screen-Angle-Changing Mechanism

LINK-BELT COMPANY

PHILADELPHIA CHICAGO INDIANAPOLIS
SAN FRANCISCO TORONTO

Offices in Principal Cities 5080

"DIAMOND"

DREDGE PUMPS

Equipped with the

"WEAR RESISTER"

ARE CUTTING COSTS FOR THEIR OWNERS TODAY

•

Don't Delay

INVESTIGATE

YOU TOO CAN SAVE

•

SENSATIONAL pump performance is achieved by the new "Wear Resister"—a Pettibone Mulliken development that stops destructive abrasion by protecting pump shell, side plates and liners at vital points. It prolongs pump life, reduces repair costs, eliminates costly shutdowns and steps up production. It contributes to the high record of Diamond Dredge Pumps for *wearability* under severe conditions.

Write for Bulletin of the new "Wear Resister," and read how it may be adapted to your installation.

PETTIBONE MULLIKEN CO.

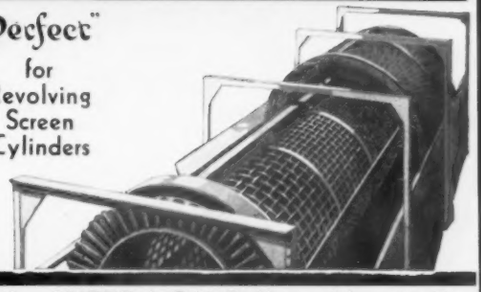
4712 Division Street, Chicago, Ill.

"The Perfect"

SUPER-LOY

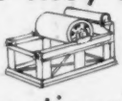
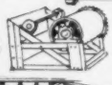
WOVEN WIRE SCREENS

"Perfect" for Revolving Screen Cylinders



Ask for SUPER-LOY Bulletin No. 48-E

LUDLOW-SAYLOR WIRE CO. ST. LOUIS

RODUCERS who know BARBER GREENES, no longer build their own elevating conveyors. Since they must have s, , and  terminals  anyway, they can purchase the sectional steel frame for a trifle more than the wood, and have a real that is ready at the .

But there are still many field conveyors of the warping wood type – chiefly because field conveyors must be moved or lengthened every few months. BARBER GREENES are designed to meet more changes, set-ups, knock-downs, and moves than you ever saw in any gravel plant. These conveyors hold the records in the contracting game, where changes are made every so many days, instead of months! With the standardized BG units, your field conveyor can reach from A to B, then from A to C or even from A to Z. One conveyor can be made into two . You have the permanence of service that only steel can give - and flexibility that wood has never given. Investigate! There is no obligation.

BARBER-GREENE COMPANY, 492 WEST PARK AVENUE, AURORA, ILLINOIS